Series 1959, No. 1

Issued November 1961

SOIL SURVEY

Douglas County Georgia

OUR SOIL ★ OUR STRENGTH

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATIONS

HOW TO USE THE SOIL SURVEY REPORT

THIS SOIL SURVEY of Douglas County, Ga., will serve various groups of readers. It will help farmers in planning the kind of management that will protect their soils and provide good yields, and it will add to the knowledge of soil scientists.

In making this survey, soil scientists walked over the fields and woodlands. They dug holes and examined surface soils and subsoils; measured slopes with a hand level; noticed differences in growth of crops, weeds, and brush; and, in fact, recorded all the things about the soils that they believed might affect their suitability for farming, trees, wildlife, and related uses.

The scientists plotted the boundaries of the soils on aerial photographs. Then, cartographers prepared from the photographs the detailed soil map in the back of this report. Fields, woods, roads, streams, and many other landmarks can be seen on the map.

Locating the soils

Use the *index to map sheets* to locate areas on the large map. The index is a small map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located. When the correct sheet of the large map is found, it will be seen that boundaries of the soils are outlined and that there is a symbol for each kind of soil. All areas marked with the same symbol are the same kind of soil, wherever they appear on the map. Suppose, for example, an area located on the map has the symbol MhB2. The legend for the detailed map shows that this symbol identifies Madison gravelly fine sandy loam, 2 to 6 percent slopes, eroded. This soil and all others mapped in the county are described in the section, "Descriptions of Soils."

Finding information

Special sections of the report will interest different groups of readers. The introductory part, which mentions geology, physiography, drainage, and climate, and gives some statistics on agriculture, will be of interest mainly to those not familiar with the county. The guide to mapping units at the back of the report will help the reader to use the map and the report.

Farmers and those who work with farmers can learn about the soils in the section, "Descriptions of Soils," and then turn to the section, "How to Use and Manage the Soils." In this way they first identify the soils on their farm and then learn how these soils can be managed and what yields can be expected. The soils are grouped by capability units; that is, groups of soils that need similar management and respond in about the same way. For example, Madison gravelly fine sandy loam, 2 to 6 percent slopes, eroded, is shown to be in capability unit IIe-1 and in woodland group 1. The management this soil needs will be stated under the heading for capability unit IIe-1 and under the heading for woodland group 1 in the section, "How To Use and Manage the Soils." If help is needed in planning management for a farm, the local representative of the Soil Conservation Service, the county agricultural agent, or members of the staff of the State agricultural experiment station will give assistance.

Foresters and others interested in woodlands can refer to the section, "Woodland Suitability Groupings." In that section the kinds of trees in the county are described and the factors affecting the management of woodlands are explained.

Engineers will want to refer to the section, "Engineering Uses of Soils." Tables in that section show characteristics of the soils that affect engineering.

Soil scientists will find information about how the soils were formed and how they are classified in the section, "Genesis, Morphology, and Classification of Soils."

Students, teachers, and other users will find information about soils and their management in various parts of the report, depending on their particular interest.

Newcomers in Douglas County will be especially interested in the section, "Soil Associations," which describes the broad pattern of the soils. They may also wish to read the section, "General Nature of the Area," which gives additional information about the county.

* * * * *

Fieldwork for this survey was completed in 1959. Unless otherwise indicated, all statements in the report refer to conditions in the county at that time. This publication on the soil survey of Douglas County, Ga., is part of the technical assistance furnished to the West Georgia Soil Conservation District.

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SOIL SURVEY OF DOUGLAS COUNTY, GEORGIA

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SOILS SURVEYED BY R. D. WELLS, J. F. BROOKS, T. N. CRABB, AND H. B. RAVENHOLT, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE IN COOPERATION WITH THE UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE, AGRICULTURAL EXPERIMENT STATIONS

DOUGLAS COUNTY occupies 201 square miles, or 128,640 acres, in the northwestern part of Georgia (fig. 1). The county is bounded on the southeast by the Chattahoochee River, which separates it from Fulton County. It is bounded on the north by Cobb and Paulding Counties, and on the south and west, by Carroll County. The county measures approximately 20 miles from east to west, and 14 miles, from north to south.

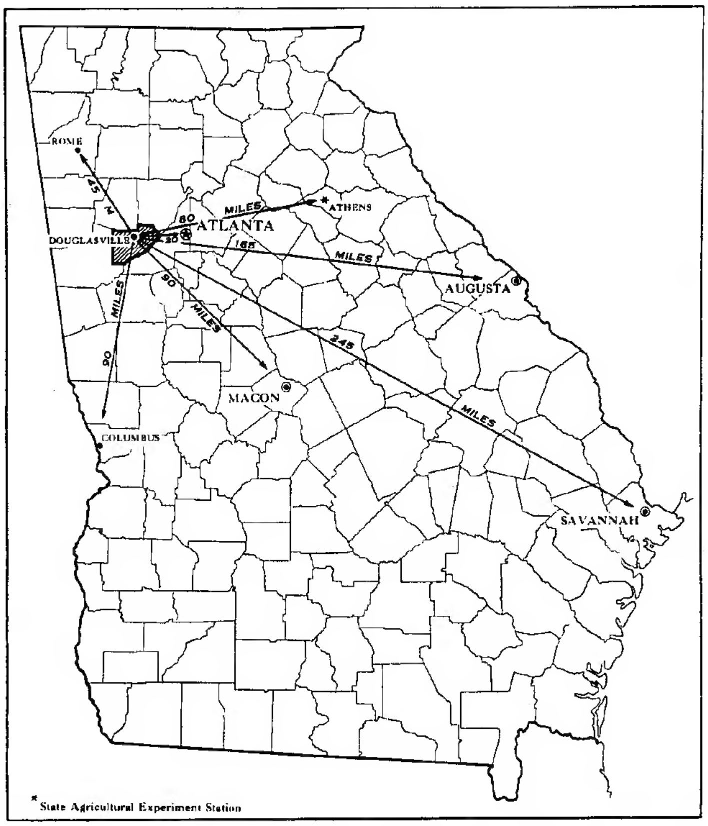

Figure 1.—Location of Douglas County in Georgia.

General Nature of the Area

This section gives information about the organization, settlement, and population of the county and describes the geology, physiography, drainage, water supplies, and vegetation. It also gives facts about the social and industrial development, including agriculture, and discusses the climate of the county in relation to crops that are grown.

Organization, Settlement, and Population

Douglas County was organized on October 17, 1870, from parts of Cobb and Campbell Counties. The part taken from Campbell County had been a part of Carroll County until 1828.

Early settlers in the area that is now Douglas County arrived in the 1820's from the eastern part of Georgia or from Virginia and the Carolinas. Early farming operations were geared to growing corn, wheat, barley, cattle, hogs, chickens, and sheep for home use or for trading locally.

The population of the county was 12,173 in 1950. In that year about 40 percent of the population was classed as rural. In contrast, in 1930 and in previous years, about 72 percent of the population was classed as rural. Since 1950, the estimated proportion of people in rural areas in relation to the number in urban areas has declined even further, as a number of people, formerly operating farms, have accepted employment in industries in nearby Atlanta.

Geology, Drainage, and Physiography

Douglas County is entirely within the Piedmont Plateau. About 70 to 75 percent of it is underlain by schist, biotite gneiss, and other metamorphic rocks. The remaining 25 to 30 percent is underlain by Augen gneiss, hornblende gneiss, granite gneiss, granite intrusions, or other igneous rocks. The effect of these rocks on the soils of Douglas County is discussed in the section, "Genesis, Morphology, and Classification of Soils."

The Chattahoochee River drains all of this county. Most of the county slopes southeast to this river, but about 20 percent of it slopes northwest and drains into Sweetwater Creek and then into the Chattahoochee River. In most places the top of the ridge that separates these two drainage areas is nearly 1,200 feet above sea level. The ridge extends from Lithia Springs in the northeast, through Douglasville and Winston and westward to the county line. The lowest point in the county, about 700 feet above sea level, is the area where the Chattahoochee River leaves the county.

Practically all of the upland areas are well drained by one of the many branching creeks or intermittent streams. Most of the upland areas are gently sloping or rolling, but some of the areas along drainageways have strong slopes.

Water Supplies

The Chattahoochee River and the many other permanent streams of the county are excellent sources of water for cities, industries, and irrigation. Most farms, however, get water for domestic use from shallow dug wells. These wells commonly yield 2 to 5 gallons of water per minute (*4*)[1] and are less than 60 feet deep.

Drilled wells are also used to provide water for many of the rural homes. These wells are commonly 6 to 12 inches in diameter and 200 to 250 feet deep. As a rule, they yield 6 to 10 gallons per minute. Although drilled wells that supply cities and industries in the Atlanta area yield as much as 400 gallons per minute, none of the rock strata in the county can be counted on to yield as much as one-half gallon per minute to every well. Generally, there are no water-bearing fractures of any importance at a depth below 250 feet.

The water table is generally highest in April and May and lowest in October and November. Contrary to popular belief, it is not becoming lower each successive year, except in a few small areas. If there is a general lowering of the water table over a large area, a decrease in the amount of rainfall in the area as a whole is probably the cause.

Vegetation

Practically all of Douglas County was once covered by forests. Clearing the areas so that cultivated crops could be grown was begun early in the 1800's. The gently sloping uplands and well-drained parts of the flood plains were cleared first. Cutting of timber for commercial use was not begun until immediately after the Civil War, when large amounts of lumber were needed to rebuild the city of Atlanta. By the early 1900's, most of the original forests had been cut over.

About 83,000 acres in the county is now covered by trees, and another 9,500 acres of idle land will probably become forested within the next few years. The forests consist mainly of three major forest types (*8*); namely, oak-hickory, loblolly pine, and oak-pine. About three-fourths of the total acreage is occupied by trees of the oak-pine forest type. Most of the acreage under forest is understocked or is stocked with low-value hardwoods. The average present stand on woodland areas contains more than 3 cords of cull hardwoods per acre.

In 1951, the Georgia Forestry Commission, in cooperation with the county commissioners, organized a fire-protection unit in the county. Since that time, no forest fire has burned over more than a few acres. This also protects the soils, for, as a rule, burned-over land is highly susceptible to erosion.

[1] Italic numbers in parentheses refer to Literature Cited, page 84.

Pine seedlings have been set out in increasing numbers in the county for several years. About 250,000 were set out during the 1958-59 planting season.

According to the U.S. Bureau of the Census, the value of all forest products sold in the county in 1954 averaged less than 25 cents per acre. In 1957, however, the estimated value of pulpwood sold was about $1 per acre. Competent foresters calculate that this figure is still far below the potential amount that could be derived from the sale of wood products in the county if suitable kinds of trees were grown.

In 1954, 10,499 acres of woodland was pastured. The areas of woods range are scattered throughout the county. About three-fourths of the acreage used for woods range is covered by a hardwood-pine type of forest, and about one-fourth, by conifers. Some areas are occupied mainly by hardwoods, and forbs, rather than grasses, make up most of the rest of the vegetation. In many places woods range and tame pasture are within the same fenced area. Generally, the areas used for woodland range have stronger slopes than those used for tame pasture. In some areas erosion is a hazard near the edges of woods that are grazed. Traffic and the bedding of livestock at these points cause much of the ground cover to be lost. The range plants are mainly little bluestem, lespedeza, tickclover, broomsedge, big bluestem, and panicum.

Industries

Douglasville has a rug factory, an asphalt plant, and a roofing plant. A quarry for granite rock aggregate is about 2 miles west of Douglasville. Developing sized stones from similar areas is a potential industry for the county. Many small shafts were sunk in search of gold before 1900, but they have not been worked for more than 50 years. Mica is abundant throughout the county and could be mined on a commercial scale.

Many people who live in the county commute daily to jobs in Atlanta and other nearby cities. A much larger number of people are employed in industries in the county or in Atlanta and other nearby cities than are employed in farming and related activities. Many families have one or more members employed in industry, and they farm on a part-time basis.

Transportation and Markets

U.S. Highway No. 78 extends from east to west through the county. State Highways 5, 61, 92, and 166 also pass through the county. All of these highways and many of the county roads are paved. Most of the other county roads are surfaced with sandy or gravelly materials and are serviceable throughout the year. A line of the Southern Railway System crosses the county from east to west.

Markets are available in Douglasville for corn, grain, and cotton. The State Farmers Market in Atlanta is only a few miles away, and many farmers use it as an outlet for their surplus vegetables, melons, fruits, and other produce. Sale barns where livestock are sold are located in Atlanta and Carrollton. No farm is more than 25 miles from one of these sale barns.

Community Facilities

Several grammar schools are located in the county. One high school at Douglasville serves the entire county. School buses cover practically every road and take students to and from school. The county has many Protestant churches.

Electricity and telephone service are available to nearly all the farms in the county. Most of the homes have radio and television sets. Natural gas is supplied by two transmission lines that cross the county.

Agriculture

Farming has changed greatly in Douglas County during the past few years. Formerly, a general type of farming was practiced on most farms and the crops were mainly cotton and corn. Now, farming is more specialized. Of the 890 farms in the county in 1954, 25 were poultry farms and 7 were dairy farms. There were 75 vegetable farms, as compared to 22 in 1950. Also, in 1954, cotton was reported grown on 174 farms, as compared to 460 farms in 1949 and 1,025 farms in 1939.

In 1954, nearly 70 percent of the income from the sale of farm products was derived from the sale of livestock and livestock products. A total of 266,707 gallons of whole milk was sold, 209,496 dozen eggs, and 421,048 chickens. Table 1 shows the acreage of the principal field crops, fruit and nut trees, and grapevines in specified years. Table 2 shows the number of livestock on farms and gives information about livestock products sold.

Farms are more mechanized than in former years. A total of 339 tractors was reported on 290 farms in 1954; 372 motortrucks, on 353 farms; and 485 automobiles, on 434 farms. The number of farms less than 10 acres in size has increased as farming has become more intensive, as vegetable crops have been grown more extensively, and as farmers have taken part-time work elsewhere. In 1954, 287 farms were 9 acres or less in size, as compared to 189 farms in 1949, and only 7 farms were 100 acres or more in size. A total of 635 farmers were full owners of their farms, 68 were part owners, and 187 were tenants.

TABLE 1.—*Acreage of the principal crops and number of fruit and nut trees and grapevines of bearing age*

Crop	1954	1949	1939	1929
	Acres	*Acres*	*Acres*	*Acres*
Corn for all purposes	5, 677	8, 361	14, 057	12, 289
Cotton	1, 274	3, 983	7, 781	15, 386
Oats threshed or combined	632	305	365	7
Soybeans grown for all purposes	490	632	1, 630	159
Hay crops, excluding soybeans, cowpeas, peanuts, and sorghum:				
Lespedeza	1, 236	884	110	(1)
Small grains	534	326	61	122
Alfalfa, clover, and their mixtures	157	107	(2)	33
Other hay cut	256	413	33	117
	Number [3]	*Number* [4]	*Number* [4]	*Number* [4]
Apple trees	2, 540	3, 744	5, 173	11, 120
Peach trees	1, 621	3, 447	7, 328	10, 738
Pear trees	436	450	784	653
Fig trees	475	915	719	408
Grapevines	2, 510	4, 627	3, 691	1, 460
Pecan trees (improved)	119	337	1, 170	133

[1] Not reported.
[2] Information not available (less than 3 farms reporting).
[3] For 1954, does not include data for farms with less than 20 trees or grapevines.
[4] Number in census years 1950, 1940, and 1930.

TABLE 2.—*Livestock on farms and dairy and poultry products sold*

Livestock	1954	1949	1939	1929
	Number	*Number*	*Number*	*Number*
Horses and mules	689	1, 050	1, 633	1, 988
Cattle and calves	4, 554	2, 597	2, 432	2, 592
Milk cows	1, 322	1, 154	1, 537	1, 587
Hogs and pigs	2, 569	1, 598	1, 597	1, 078
Chickens [1]	59, 775	25, 552	30, 333	31, 711
Whole milk sold (gallons)	266, 707	125, 883	109, 132	34, 839
Chickens sold	421, 048	51, 009	24, 388	21, 610
Eggs sold (dozens)	209, 496	102, 090	[2] 188, 628	[2] 226, 516

[1] Four months old and over. [2] Eggs produced (dozens).

Climate and Crops

Its location at an altitude of 700 to 1,200 feet above sea level and closeness to the Atlantic Ocean cause Douglas County to have a more moderate climate than might be expected from its latitude and its continental position. Summers are warm, but temperatures are not excessively high. During about 60 days of an average year, the maximum temperature equals or exceeds 90 degrees. A temperature of 100 degrees or higher is reached on an average of two times or less during the year. The highest temperature on record in this part of the State is 108 degrees, recorded on September 5, 1925. The minimum temperatures in summer range to the low seventies but usually are in the low sixties. Generally, temperatures at night are low enough to be comfortable.

As is typical of winters in the southeastern United States, the winters in Douglas County are not severe for the crops grown. Freezing occurs on an average of about 45 days in winter, and temperatures as low as 20 degrees may be expected on about 10 days each year. Temperatures below zero have never been recorded in Douglas County, and nearby weather stations have recorded only three such readings in more than 30 years. Based on average temperatures, January of 1940, with its average of 30 degrees, is the coldest month on record at Newnan, Ga., in nearby Coweta County. In no other month has the average temperature been below freezing. In this part of the State, the ground seldom freezes to a depth of more than 3 inches and rarely stays frozen more than 4 days.

The average length of the growing season in Douglas County is about 228 days. The average date of the last freezing temperature in spring is March 25, and the average date of the first frost in fall is November 9 (*3*).

Douglas County, with an annual average rainfall of more than 50 inches, has enough moisture for agriculture and related activities. In spite of this apparent abundant rainfall and the fairly even distribution throughout the year, dry spells of varying lengths do occur. These are usually more frequent late in summer and in autumn, when long periods of mild, sunny weather are common. The total annual rainfall for this area has ranged from a low of 31.28 inches, recorded at Newnan, Ga., in 1954, to 82.20 inches, recorded in 1932 at Tallapoosa, Ga., which is about 20 miles west in Haralson County. Since 1940, the greatest amount of rainfall for any one month in Douglas County was 17.66 inches, recorded in November 1948, and the least amount was 0.24 inch, recorded in October 1952. The greatest daily rainfall, 4.55 inches, was recorded in May 1948. A total of 4.54 inches was recorded in April 1957.

Measurable snowfall occurs in Douglas County during less than one-half of the winters and is of minor importance. The last snowfall of consequence occurred in March 1942, when 5.5 inches was measured at Newnan and 12 inches was measured at Tallapoosa.

Observations of relative humidity and wind are not available for Douglas County, but records at Atlanta, about 20 miles east of Douglas County, show that humidity in the early part of the morning averages 75 to 85 percent, and in the early part of the afternoon, from 51 to 64 percent. The lower values for each are applicable to March and April. The higher morning humidities occur in July and August, and the higher afternoon values, in December and January. Wind velocity is moderate; the average hourly windspeeds range from 7.4 miles per hour in August to 11.9 miles per hour in February.

This range of rainfall, temperature, wind, and humidity makes the climate suitable for growing many different crops. The soil is usually wet throughout the winter and early in spring. Nevertheless, during some periods it is dry enough to permit tillage.

Except for small grains, clover, and grasses, crops are usually planted and become established in April, May, and June. During that time, moisture is normally favorable for fieldwork and for seeds to germinate. According to records kept over a 10-year period (*10*), however, rainfall in excess of 1.5 inches per week can be expected 13 times in 10 years during April, 9 times in May, and 12 times in June. This amount of rainfall delays fieldwork materially. It may also cause considerable erosion because the soil is more likely to be bare during that period than at any other time of the year.

As a rule, moisture conditions in fall are favorable for preparing a seedbed and for plants to germinate. In some years, however, there is little rain during the fall months. As a result, germination is retarded by lack of moisture and preparation of a seedbed is difficult in the less friable soils.

The growing season, or frost-free period, in this county is long enough so that cotton, corn, grain sorghum, millet, tomatoes, watermelons, beans, potatoes, and similar crops can be planted over a period of many weeks and still have plenty of time to mature. The winters are mild enough so that fall-sown small grains survive well. If small grains are seeded early, they provide grazing for livestock during the winter, although their growth is slow from November 20 to February 20.

Fescue, clover, and other perennial pasture plants make some growth during the winter when temperatures are above 40° F. There are normally enough low-temperature hours during each winter to meet the minimum requirements for a dormant season for peaches and similar crops.

The accompanying tables give useful information about the climate of Douglas County. Table 3 shows, by months, the average, absolute maximum, and absolute minimum temperatures and the average, lowest, and highest rainfall.

Table 4 gives the number of days per year, by months, that specified amounts of rainfall may be expected. Table 5 gives similar information for heavier rains. Table 6 shows the number of dry spells of 2, 4, and 6 weeks' duration, respectively, that may be expected throughout the year.

By referring to table 7, one can estimate the chances of crops grown early in spring or late in fall being damaged by freezing temperatures (*3*).

TABLE 3.—*Temperature and precipitation for Douglas County, Ga.*

Month	Temperature [1]					Precipitation [2]				
	Average	Absolute maximum		Absolute minimum		Average	Driest month and year		Wettest month and year	
	°F.	°F.	Year	°F.	Year	Inches	Inches	Year	Inches	Year
December	44.5	79	1952	10	1945	4.39	1.49	1946	8.53	1951
January	47.9	81	1949	9	1942	4.69	2.33	1951	9.46	1947
February	47.1	80	1954	3	1958	4.77	1.30	1943	7.58	1956
Winter	46.5	81	1949	3	1958	13.85				
March	52.4	93	1955	8	1943	6.22	3.40	1954	10.92	1952
April	61.8	91	1942	28	1943, 1944, 1950	4.76	1.53	1942	10.72	1957
May	69.5	97	1941	35	1944	3.28	.66	1951	6.67	1948
Spring	61.2	97	1941	8	1943	14.26				

See footnote at end of table.

TABLE 3.—*Temperature and precipitation for Douglas County, Ga.*—Continued

Month	Temperature [1]					Precipitation [2]				
	Average	Absolute maximum		Absolute minimum		Average	Driest month and year		Wettest month and year	
	°F.	°F.	Year	°F.	Year	Inches	Inches	Year	Inches	Year
June	76. 3	101	1944	44	1956	3. 51	1. 16	1948	7. 12	1958
July	78. 3	100	1944	51	1951	5. 26	. 55	1947	11. 33	1948
August	77. 5	100	1943, 1947, 1954	51	1951	3. 70	. 55	1951	8. 29	1948
Summer	77. 4	101	1944	44	1956	12. 47				
September	72. 1	100	1951, 1954	39	1949	3. 72	. 45	1947, 1955	8. 54	1957
October	62. 1	97	1954	23	1954	2. 17	. 24	1953	4. 63	1957
November	50. 8	83	1950	2	1950	3. 54	. 72	1949	17. 66	1948
Fall	61. 6	100	1951, 1954	2	1950	9. 43				
Year	61. 6	101	1944	2	1950	50. 01	31. 28	[3] 1954	82. 20	[4] 1932

[1] Temperature based on an 18-year record, through 1958.
[2] Precipitation based on an 18-year record, through 1958.
[3] From records at station at Newnan, Ga.
[4] From records at station at Tallapoosa, Ga.

TABLE 4.—*Average number of days per year (by months) with rainfall equal to or greater than the stated amounts*

[Based on 10-year record in the period 1949 through 1958]

Rainfall equal to or greater than—	Average number of days in—												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Inches 0. 10	7	8	9	7	6	6	9	5	6	4	4	7	78
. 25	5	5	6	5	5	4	6	3	4	3	4	5	55
. 50	3	4	4	3	3	3	4	2	3	2	2	3	36

TABLE 5.—*Total number of days in 10 years (by months) with rainfall equal to or greater than the stated amounts*

Rainfall equal to or greater than—	Total number of days in—												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Inches 1. 00	13	18	14	16	5	10	15	5	15	9	5	13	138
2. 00	3	1	2	4	1	2	2	1	6	2	0	2	26
3. 00	0	0	2	1	0	0	1	0	0	0	0	1	5
4. 00	0	0	1	1	0	0	0	0	0	0	0	0	2

TABLE 6.—*Number of periods free of precipitation [1] in 10 years equal to or greater than the stated length*

Periods free of precipitation equal to or greater than—	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
2 weeks	5	2	1	4	5	5	3	10	7	8	4	5	59
4 weeks	1	0	0	1	1	0	0	1	3	2	1	0	10
6 weeks	0	0	0	0	0	0	0	0	1	1	0	0	2

[1] Period free of precipitation, as used here, means period with little or no precipitation, that is, not more than 0.25 inch per day.

TABLE 7.—*Probabilities of last freezing temperatures in spring and first in fall* [1]

Probability [2]	At least a light freeze	At least a moderate freeze	Severe freeze
Spring:			
50	Mar. 25	Mar. 14	Feb. 26.
20	Apr. 7	Mar. 22	Mar. 14.
10	Apr. 16	Mar. 28	Mar. 17.
Fall:			
50	Nov. 9	Nov. 20	Dec. 1.
20	Oct. 29	Nov. 10	Nov. 20.
10	Oct. 23	Nov. 5	Nov. 16.

[1] Temperatures in a light freeze range from 28° through 32° F., and, as a rule, only the tenderest plants are killed. Temperatures in a moderate freeze range from 24° through 28° F., and most plants are damaged to some extent. Temperatures in a severe freeze are 24° F. or less, and most cultivated plants are damaged heavily.

[2] Number of chances in 100 that event will occur. For example, in 50 years out of 100, or 1 year out of 2, a severe freeze will occur in spring after February 26; in 20 years out of 100, or 2 years out of 10, at least a moderate freeze will occur in fall before November 10.

ESTIMATING PROBABILITY OF DROUGHT DAMAGE TO A CROP

Lists A and B can be used with table 8 to judge the likelihood that drought will damage a particular crop on a specified soil. In list A find the name of the crop and the average depth of its root zone. Then turn to list B, where total capacity of soils to hold moisture is given for 12-inch, 24-inch, and 36-inch depths. When you have learned the available moisture capacity of the soil down to the depths where roots of the crop will penetrate, turn to table 8, where you are given the chances of drought days, by months, for 1-inch, 2-inch, 3-inch, 4-inch, and 5-inch capacities.

Suppose you want to know how likely it is that there will be dry days in July that will retard growth of garden vegetables on Madison gravelly fine sandy loams. In list A you note that vegetables have most of their roots in the top 12 inches of soil; therefore, in list B, you read under "12 inches of soil depth" and find that Madison gravelly fine sandy loams hold approximately 2 inches of available moisture to a depth of 12 inches. Then turn to table 8 and find the column giving 2 inches of moisture, and read under the "Probability" column the chances of days when drought will damage vegetables. The chances are 1 in 10 there will be at least 19 drought days in July, 2 in 10 that there will be at least 16 drought days, 3 in 10 that there will be at least 13 drought days, and 5 in 10 that there will be at least 8 drought days.

Or, again, suppose you want to know the likelihood of dry days in June that will retard growth of corn if it is planted on State fine sandy loan. Corn has most of its roots in the top 24 inches (list A), and to that depth (list B) the State soil holds approximately 4 inches of moisture. By referring to table 8, under the 4-inch column, we can see that there will be at least 7 drought days for corn on this soil for half the time, or 5 years out of 10. Thus, you weigh the cost of growing corn against the chance of damage and then decide whether supplemental drainage should be considered.

LIST A: Normal Root Zone for Common Crops on Permeable Soil

Eighty percent of roots at depth not exceeding—

12 inches	*24 inches*	*36 inches*
Grasses (annual).	Cantaloups.	Alfalfa.
Lespedeza (annual).	Clover (crimson).	Fruit trees.
Most garden vegetables.	Clover (white).	Kudzu.
Small grains.	Corn.	Lespedeza sericea (perennial).
	Cotton.	
	Cowpeas.	
	Grain sorghum.	
	Lima beans.	
	Soybeans.	
	Tomatoes.	

LIST B: Total Available Moisture

Soils	Approximate available moisture, in inches of water in soil from surface to— 12-inch depth	24-inch depth	36-inch depth
Alluvial land	2	3	4
Altavista fine sandy loam	1	3	5
Appling sandy clay loam	2	3	5
Appling sandy loam	1	3	5
Augusta silt loam	2	4	5
Buncombe loamy sands	1	2	3
Chewacla soils	2	3	5
Colfax sandy loam	2	3	4
Congaree soils	2	4	5
Davidson clay loam	1	3	4
Davidson loam	1	2	4
Helena sandy loam	1	3	4
Lloyd clay loam	1	3	4
Lloyd sandy loam	2	3	5
Louisa fine sandy loam	1	2	(1)
Louisburg complex	1	2	(1)
Madison gravelly fine sandy loam	2	3	5
Madison gravelly sandy clay loam	1	3	5
Mecklenburg sandy loam	1	3	5
Molena loamy sand	1	2	3
Musella clay loam	1	3	(1)
Musella stony clay loam	1	3	(1)
State fine sandy loam	2	4	5
Wehadkee silty clay loam	2	3	4
Wickham clay loam	1	3	5
Wickham fine sandy loam	2	3	5
Wilkes sandy loam	1	1	(1)

[1] Roots generally do not penetrate below a depth of 24 inches.

Soil Associations

In mapping a county or other large tract, it is fairly easy to see differences in the soils and landscape as one travels from place to place. There are many obvious differences, among them differences in the shape, gradient, and length of slopes; in the number and size of streams; in the width of the flood plains or valleys that border the streams; in the kinds of native plants; and even in the kinds of agriculture. With these obvious differences, there are less easily noticed differences in the patterns of soils. The soils differ along with the other parts of the environment.

By drawing lines around the different patterns of soils on a small map, one may obtain a map of the soil associations or, as they are sometimes called, general soil areas. Such a map is useful to those who want only a general idea of the soils, who want to compare different parts of a county, or who want to locate large areas suitable for some particular kind of agriculture or other broad land use.

TABLE 8.—*Probabilities of drought days on soils of different moisture-storage capacity*

Month [1]	Probability	Minimum drought days if soil has a moisture-storage capacity of [2]—				
		1 inch	2 inches	3 inches	4 inches	5 inches
April	1 in 10	15	0	0	0	0
	2 in 10	12	0	0	0	0
	3 in 10	10	0	0	0	0
	5 in 10	7	0	0	0	0
May	1 in 10	24	21	15	8	0
	2 in 10	21	17	10	0	0
	3 in 10	19	14	7	0	0
	5 in 10	15	9	0	0	0
June	1 in 10	24	23	22	20	15
	2 in 10	21	20	18	15	10
	3 in 10	19	17	16	12	7
	5 in 10	16	13	11	7	0
July	1 in 10	21	19	18	18	17
	2 in 10	19	16	14	13	11
	3 in 10	17	13	11	9	6
	5 in 10	13	8	6	0	0
August	1 in 10	22	20	18	17	16
	2 in 10	20	16	13	12	11
	3 in 10	17	12	9	8	7
	5 in 10	13	8	0	0	0
September	1 in 10	24	23	21	19	18
	2 in 10	21	19	16	14	12
	3 in 10	19	16	13	10	8
	5 in 10	16	11	7	0	0
October	1 in 10	28	26	26	25	24
	2 in 10	24	20	18	16	14
	3 in 10	20	15	12	10	7
	5 in 10	14	8	0	0	0

[1] Months of January, February, March, November, and December are not shown because crops are rarely damaged by drought in these months.

[2] Storage capacity of soil is expressed as the depth of water that a soil can hold and make available to plants.

The four principal soil associations in Douglas County are shown in figure 2. Within each of these associations, the pattern of soils is fairly uniform, although a few areas of other soils may be included. A brief description of the four soil associations follows.

Association 1

Micaceous soils on broad to narrow ridges highly dissected by branching drainageways: Madison, Louisa

This association consists of very gently sloping to sloping, micaceous soils on broad to narrow interstream divides. The soils that have the strongest slopes occur along the numerous branching drainageways that join in a dendritic pattern. In most places the flood plains along these drainageways are narrow. Most of the acreage in the association is made up of gravelly fine sandy loams, but the soils in a few areas are cobbly or stony. The soils in a large acreage are severely eroded, and the texture of their surface soil is gravelly sandy clay loam.

This association covers most of the southern half of the county. It occupies about 59 percent of the total acreage in the county.

The dominant soils in the association—the Madison and Louisa—have formed in materials weathered chiefly from mica schists. In these soils bedrock is at a depth greater than 25 feet in most places. The Madison soils occupy about 70 percent of the association. They are mostly on gently sloping interstream divides. These soils are well drained and have a thick B horizon consisting of red clay.

The Louisa soils make up about 20 percent of the association. They are on the slopes along drainageways and are somewhat excessively drained. The Louisa soils differ from the Madison soils chiefly in that they have a thin and discontinuous B horizon.

Appling and Louisburg soils and areas of Alluvial lands occupy about 10 percent of the association. The Appling soils are on the lower parts of the divides and on toe slopes. They have a yellower subsoil than the Madison soils and a less micaceous profile. The Louisburg soils have stronger slopes than the other soils and are generally shallow and somewhat excessively drained. The areas of Alluvial lands are along drainageways. In these areas drainage ranges from somewhat poor to moderately good and the texture of the soil materials ranges from loamy sand to silt loam. Loamy sand is dominant.

About 85 percent of the acreage in the association is woodland. The trees are mainly loblolly and shortleaf pines, which grow in old, abandoned fields. Most of the farms are small and are operated part time by the owner. They are mainly general farms, but on a few farms, dairy cattle, beef cattle, or poultry provide the principal source of farm income. Truck patches, where lima beans, tomatoes, cantaloups, and similar crops are grown, are common on the smoother ridgetops. Yields of these crops are fairly high.

Association 2

Reddish, clayey soils from basic and acidic rocks on broken, irregular ridges dissected by numerous drainageways: Musella, Lloyd, Davidson

This association consists of soils on smooth to rolling interstream divides. The slopes along the numerous drainageways are generally irregular and steep. The flood plains along the drainageways vary in width, but in most places they are narrow. The soils in most of the association are severely eroded. The association is in the northwestern corner of the county. It occupies about 15 percent of the acreage in the county.

The dominant soils in this association—the Musella, Lloyd, and Davidson—have formed in materials weathered from basic rocks, chiefly diorite, hornblende gneiss, and diabase. In these soils depth to bedrock ranges from about 2 feet in the Musella soils to more than 10 feet in the Davidson soils.

The Musella soils make up about 40 percent of the association. They generally have irregular slopes and are well drained. The texture of the surface layer is

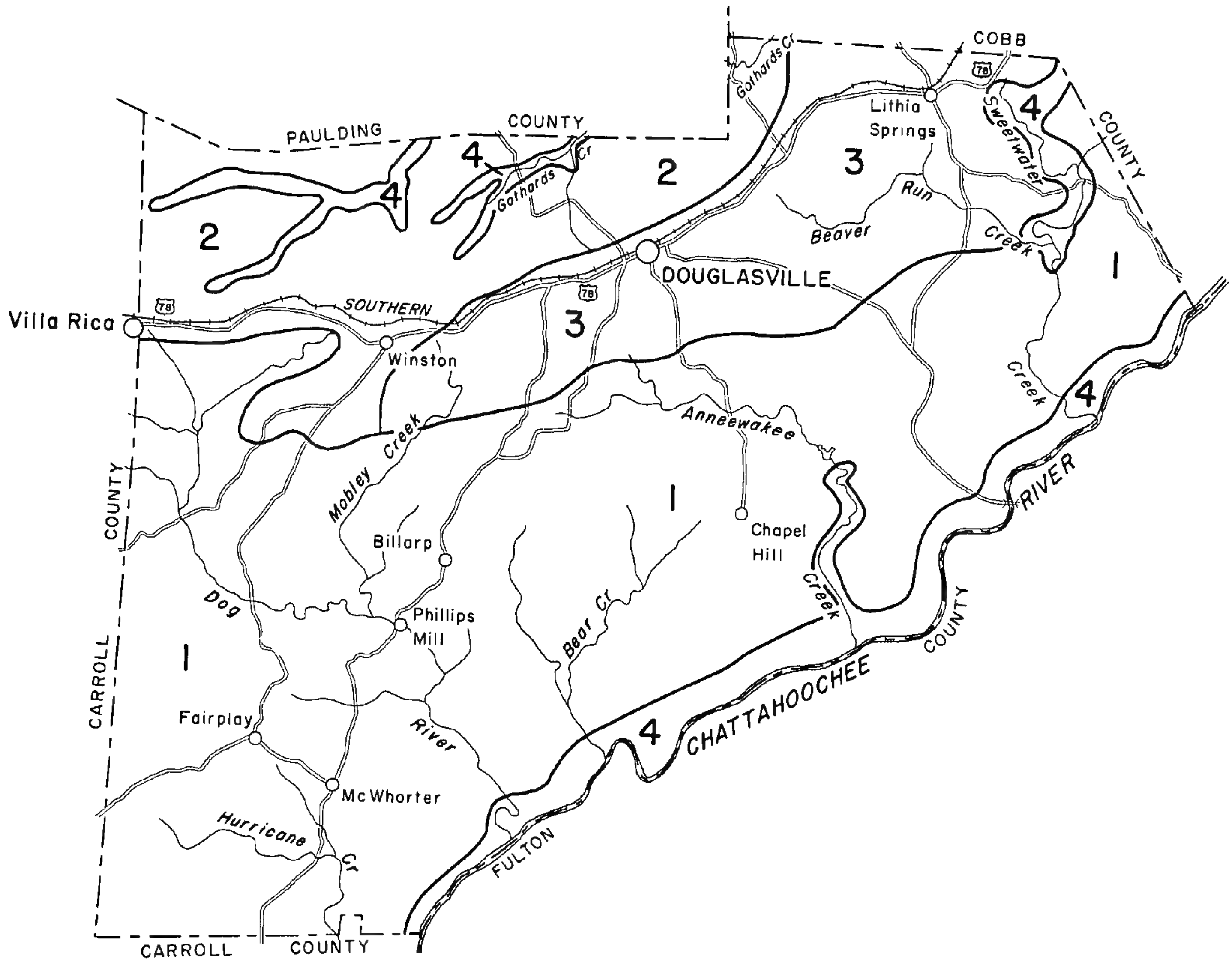

Figure 2.—**Soil associations of Douglas County, Ga.**

1. **Micaceous soils on broad to narrow ridges highly dissected by branching drainageways: Madison, Louisa.**
2. **Reddish, clayey soils from basic and acidic rocks on broken, irregular ridges dissected by numerous drainageways: Musella, Lloyd, Davidson.**
3. **Brownish or red and yellow, mottled soils from granitic rocks on broad, rolling divides: Appling, Louisburg.**
4. **Alluvial lands on nearly level flood plains and on the adjoining gently rolling stream terraces: Alluvial lands, Wickham, Congaree.**

clay loam. The B horizon is thin and discontinuous and consists of dark-red clay.

The Lloyd soils occupy about 17 percent of the association. They have smooth slopes and are well drained. The surface layer ranges in texture from clay loam to sandy loam, and the soils have a thick B horizon of dark-red clay.

About 13 percent of the association consists of Davidson soils. These soils also have smooth, mild slopes and are well drained. The surface layer is dark reddish-brown clay loam or loam, and the B horizon is thick and consists of dark-red clay.

Minor areas included in the association are occupied by Madison, Appling, Louisburg, Wilkes, Helena, and Mecklenburg soils and by Alluvial lands. These soils make up about 30 percent of the association. The Madison and Appling soils are deep and well drained. They have formed from materials weathered from acidic rocks. The Louisburg and Wilkes soils are shallow and somewhat excessively drained. They have a thin and discontinuous B horizon. The Helena soils are somewhat poorly drained and have a subsoil of mottled, plastic clay. The Mecklenburg soil is moderately deep and moderately well drained. It has a subsoil of yellowish-red, plastic clay. The areas of Alluvial lands are along drainageways. In these areas drainage ranges from somewhat poor to moderately good.

About 75 percent of the acreage in this association is in woods, and 14 percent is cropped. The rest is pastured or idle. Most of the farms are small and are operated part time by the owner. They are mainly general farms, but a few farms are used chiefly for raising beef cattle. The farms are largely nonmechanized. Cotton, corn, and annual hay are the principal crops.

Association 3

Brownish or red and yellow, mottled soils from granitic rocks on broad, rolling divides: Appling, Louisburg

This association is made up of gently sloping soils on broad, interstream divides. The areas are highly dissected by the heads of drainageways that reach almost to the tops of the ridges. The flood plains along the drainageways are narrow. The soils are mainly loamy sands or sandy loams. In a few areas the soils are severely eroded and have a surface layer of sandy clay loam.

The association occupies about 14 percent of the county. It extends from near the town of Winston, along U.S. Highway No. 78, to beyond Lithia Springs. About 75 percent of it is south and east of the highway.

The dominant soils in the association—the Appling and Louisburg—have formed in materials weathered from granitic rocks. Depth to bedrock ranges from a few inches in some of the Louisburg soils to more than 5 feet in the Appling soils.

The Appling soils make up about 60 percent of the association. They are well drained and are on smoothly sloping ridges. In areas that are not severely eroded, these soils have a surface layer of sandy loam. In severely eroded areas the surface layer is sandy clay loam. The subsoil consists of red and yellow, mottled sandy clay.

The Louisburg soils make up about 20 percent of the association. They are shallow over bedrock and are somewhat excessively drained. These soils are on smooth divides or on steep, broken slopes. Unlike the Appling soils, they generally have a thin and discontinuous B horizon in most places. Some areas are stony.

Minor areas included in the association are occupied by Madison, Louisa, Musella, and Lloyd soils and by Alluvial lands. The Madison soils are gravelly and have a thick subsoil of red clay. They have formed in materials weathered from mica schist. The Louisa soils also formed in materials weathered from mica schist. They have a thin and discontinuous B horizon. The Musella and Lloyd soils are more clayey than the Madison and Louisa soils and have formed primarily in materials weathered from basic rocks. The Musella soils are shallow and have a thin and discontinuous B horizon. The Lloyd soils are deep and have a thick B horizon. The soil materials in the areas of Alluvial lands consist of alluvium of various textures. These areas are on flood plains.

About 55 percent of the acreage in this association is in woods, 22 percent is in crops, and 6 percent is in pasture. The rest is in urban or suburban areas. Most of the farms are small and are operated part time by the owner. They are mainly general farms, but, on a few, dairy cattle, swine, and poultry provide the main source of farm income. Lima beans, tomatoes, cantaloups, and watermelons are grown in a few places. The yields are generally moderate to high.

Association 4

Alluvial lands on nearly level flood plains and on the adjoining gently rolling stream terraces: Alluvial lands, Wickham, Congaree

This association is along the larger streams in the county. Most of the soils of the flood plains included in the association have a surface layer of loamy sand, fine sandy loam, or silt loam, but a few have a surface layer of silty clay loam. The soils of the stream terraces generally have a surface layer of fine sandy loam, but the surface layer of the Augusta soil is silt loam. In areas that are severely eroded, the texture of the surface layer is clay loam.

All of these soils have formed in alluvial, or transported, materials. Those on the flood plains have formed in alluvium of recent origin and have no recognizable horizons. Those on the stream terraces have formed in older alluvium. Their soil materials have been in place long enough so that all of the soils have recognizable horizons. In a few the development of horizons is far advanced. In most places bedrock is at a depth of more than 25 feet.

This association occupies about 12 percent of the county. The areas are along the Chattahoochee River and Anneewakee Creek in the southeastern part of the county and along Gothards Creek in the north-central part.

Alluvial lands, which together make up about 40 percent of this association, are on flood plains. They are moderately well drained to somewhat poorly drained. The soil materials consist mainly of sandy loam but vary in texture. As a result, the profiles vary from place to place.

The Wickham soils, on the higher stream terraces, make up about 16 percent of the association. They have distinct horizons. The surface layer is fine sandy loam, and the subsoil is red clay.

The Congaree soils, on wide flood plains, occupy about 12 percent of the association. They are well drained. The Congaree soils have a surface layer of brown silt loam or fine sandy loam. The profile is fairly uniform.

Less extensive soils included in the association are the Buncombe, Chewacla, Wehadkee, Altavista, Augusta, and State, which together occupy about 32 percent of the total acreage. The Buncombe, Chewacla, and Wehadkee soils are on flood plains. The Buncombe soils are somewhat sandy and are excessively drained, and the Chewacla soils are loamy and are somewhat poorly drained. The Wehadkee soil, a silty clay loam, is poorly drained.

The Altavista, Augusta, and State soils are on low stream terraces. The Altavista soil has a mottled subsoil and is moderately well drained. The Augusta soil also has a mottled subsoil and is somewhat poorly drained. The State soil is well drained. It has only weak horizon development, but it has a strong-brown subsoil.

About 63 percent of the acreage in this association is in woods, 22 percent is in pasture (fig. 3), and 15 percent is in crops. The farms are generally larger than farms in other parts of the county. They are mainly dairy farms or farms on which beef cattle are the principal source of farm income. Corn is grown chiefly for feed for the livestock. The farms are highly productive and are mechanized. Most of them are operated by the owner.

***Figure 3.*—Dairy heifers grazing on a pasture of fescue and whiteclover. This pasture is typical of those on farms within association 4. The soil is Augusta silt loam.**

How a Soil Survey is Made

The scientist who makes a soil survey examines the soils in the field, classifies them according to the facts he observes, and maps their boundaries on an aerial photograph or other map.

Field Study.—The scientist bores or digs many holes to see what the soils are like. The holes are not spaced in a regular pattern but are located according to the lay of the land. Most of them are not more than a quarter of a mile apart, and some are much closer. The scientist also observes the soils in road cuts and other excavations.

In most soils there are several distinct layers, called *horizons*, which collectively are known as the *soil profile.* Each layer is studied to see how it differs from others in the profile and to learn things about the soil that will influence its capacity to support the growth of plants. Color, texture, structure, and consistence are among the most important soil characteristics examined.

Most of the terms used by scientists to describe the soils are familiar and are readily understood without specialized knowledge. Some of the terms and symbols need explanation and are discussed in the following paragraphs. Others are defined in the Glossary at the back of the report.

Color is expressed in words and in Munsell notations; for example, gray (10YR 5/1). The Munsell notations record color more precisely than can be done in words and are primarily for the use of soil scientists. Unless otherwise stated, the color given for a soil is its color when moist. Color is normally related to the amount of organic matter. The darker the surface soil, as a rule, the more organic matter it contains. Streaks and spots of gray, yellow, and brown in the lower layers generally indicate poor drainage and poor aeration.

Texture, or the content of sand, silt, and clay in the soil, is determined by the way the soil feels when rubbed between the fingers. It is also checked by laboratory analysis. Texture determines how well the soil retains moisture, plant nutrients, and fertilizer and whether it is easy or difficult to cultivate.

Structure is the way the individual soil particles are arranged or grouped together in larger aggregates and the amount of pore space between aggregates. The soil aggregates may be granular, blocky, platelike, or have other forms. The size of the aggregates, their shape, and the pore space between them determine how water and air move through the soil and how well roots penetrate. If the pores are large, much water and air will move through the soil; if the pores are small, water is stored.

Consistence, or the tendency of the soil to crumble or to stick together, indicates whether the soil is easy or difficult to keep open and porous under cultivation. Consistence is described according to how sticky or how plastic the soils are when wet; how friable or firm they are when moist; and how soft or hard they are when dry. If moisture conditions are not stated in using a term for consistence, the moisture condition is that under which the particular term is defined. Thus, "friable," used without a statement of moisture content, means friable when moist; "hard," if used alone, means hard when dry; and "plastic," used alone, means plastic when wet.

Other characteristics observed in the course of the field study and considered in classifying the soils include the following: The depth of the soil over bedrock or a compact layer; the presence of gravel or stones in amounts that will influence cultivation; the steepness and pattern of slopes; the degree of erosion; the nature of the underlying material and of the parent material from which the soil formed; and the acidity or alkalinity of the soil as measured by chemical tests.

Classification.—On the basis of the characteristics observed by the survey team or determined by laboratory tests, soils are classified by series, types, and phases. Miscellaneous land types are areas of land that have little or no true soil or that have no uniformity in the arrangement of horizons. Rock outcrop, Gullied land and Alluvial lands are examples of miscellaneous land types mapped in Douglas County.

The soil type is the basic classification unit. A soil type may consist of several phases. Soil types that are similar in most characteristics are grouped into soil series. As an example, the Wickham series consists of two soil types, subdivided into four phases, as follows:

Series:
- Wickham.

Types:
- Wickham fine sandy loam.
- Wickham clay loam.

Phases:
- Wickham fine sandy loam, 2 to 6 percent slopes, eroded.
- Wickham fine sandy loam, 6 to 10 percent slopes, eroded.
- Wickham clay loam, 2 to 6 percent slopes, severely eroded.
- Wickham clay loam, 6 to 10 percent slopes, severely eroded.

Soil type.—Soils that have the same texture in the surface layer and that are similar in kind, thickness, and arrangement of soil layers are classified as one soil type.

Soil series.—Two or more soil types that differ in the texture of the surface layer but that are otherwise similar in kind, thickness, and arrangement of soil layers are normally designated as a soil series. In a given area, however, it frequently happens that a soil series is represented by only one soil type. Each series is generally named for the place near which it was first mapped.

Soil phase.—Because of differences other than in kind, thickness, and arrangement of layers, some soil types are divided into two or more phases. Variations in slope, in frequency of rock outcrops, in degree of erosion, in depth of the soil over the substratum, or in natural drainage are examples of characteristics that may justify dividing a soil type into different phases.

The soil phase (or the soil type if it has not been subdivided) is the unit shown on the soil map. It is the unit that has the narrowest range of characteristics. Use and soil management practices, therefore, can be specified in more detail for it than for soil series or yet broader groups that contain more variation.

Descriptions of Soils

In this section the soils of Douglas County are described in detail and their use and suitability for agriculture are discussed. Under each soil series a typical soil of the series is described. Following each series description are listed the mapping units that consist wholly or partly of soils of that series. The location and distribution of these soils are shown on the soil map at the back of this report.

To make the soil descriptions concise and exact, it was necessary to use some technical terms. These terms are defined in the Glossary.

The approximate acreage, proportionate extent, and uses of the soils in 1957 are given in table 9.

TABLE 9.—*Approximate acreage, proportionate extent, and uses of soils in the year 1957*

Soil	County total	Percent	Cropland	Pasture	Woodland	Idle	Urban farmstead [1]
	Acres		*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
Alluvial land:							
Moderately well drained	2, 250	1. 7	150	800	1, 250	0	50
Somewhat poorly drained	4, 500	3. 5	200	300	3, 900	0	100
Local alluvial land	205	. 2	50	0	150	0	5
Altavista fine sandy loam, 2 to 6 percent slopes, eroded	885	. 7	400	150	250	50	35
Appling sandy loam, 2 to 6 percent slopes, eroded	5, 150	4. 0	2, 300	500	1, 100	600	650
Appling sandy loam, 6 to 10 percent slopes, eroded	7, 650	5. 9	2, 300	300	3, 400	800	850
Appling sandy loam, 10 to 15 percent slopes, eroded	3, 250	2. 5	50	50	2, 900	0	250
Appling sandy clay loam, 6 to 10 percent slopes, severely eroded	750	. 6	0	250	450	0	50
Appling sandy clay loam, 10 to 15 percent slopes, severely eroded	640	. 5	50	0	550	0	40
Augusta silt loam	250	. 2	50	150	50	0	0
Buncombe loamy sands, 0 to 6 percent slopes	670	. 5	0	0	650	0	20
Chewacla soils	1, 440	1. 1	300	250	850	0	40
Colfax sandy loam, 2 to 6 percent slopes	260	. 2	0	50	150	50	10
Congaree soils	2, 050	1. 6	1, 100	100	800	0	50
Davidson loam, 2 to 6 percent slopes, eroded	155	. 1	100	0	0	50	5
Davidson loam, 6 to 10 percent slopes, eroded	260	. 2	200	0	50	0	10
Davidson clay loam, 2 to 6 percent slopes, severely eroded	210	. 2	200	0	0	0	10
Davidson clay loam, 6 to 10 percent slopes, severely eroded	260	. 2	50	50	50	100	10
Davidson clay loam, 10 to 15 percent slopes, very severely eroded	105	. 1	0	0	50	50	5
Gullied land	350	. 3	----	----	----	----	----
Helena sandy loam, 2 to 6 percent slopes, eroded	155	. 1	50	0	50	50	5
Helena sandy loam, 6 to 10 percent slopes, eroded	205	. 2	50	50	50	50	5
Helena soils, 6 to 10 percent slopes, severely eroded	205	. 2	0	0	150	50	5
Lloyd sandy loam, 2 to 6 percent slopes, eroded	155	. 1	100	0	50	0	5
Lloyd sandy loam, 6 to 10 percent slopes, eroded	315	. 2	100	50	100	50	15
Lloyd sandy loam, 15 to 25 percent slopes, eroded	515	. 4	0	50	400	50	15
Lloyd clay loam, 2 to 6 percent slopes, severely eroded	540	. 4	100	100	200	100	40
Lloyd clay loam, 6 to 10 percent slopes, severely eroded	990	. 8	100	150	600	50	90
Lloyd clay loam, 6 to 10 percent slopes, very severely eroded	105	. 1	0	0	100	0	5
Lloyd clay loam, 10 to 15 percent slopes, severely eroded	535	. 4	50	100	350	0	35
Lloyd clay loam, 10 to 15 percent slopes, very severely eroded	205	. 2	50	0	150	0	5
Louisa fine sandy loam, 10 to 15 percent slopes	630	. 5	0	0	600	0	30
Louisa fine sandy loam, 15 to 25 percent slopes	10, 200	7. 9	0	0	9, 800	0	400
Louisa fine sandy loam, 25 to 40 percent slopes	6, 150	4. 8	0	0	5, 900	0	250
Louisa fine sandy loam, 10 to 15 percent slopes, eroded	730	. 6	200	150	250	100	30
Louisa fine sandy loam, 15 to 25 percent slopes, eroded	410	. 3	50	50	250	50	10
Louisburg complex, 2 to 6 percent slopes, eroded	275	. 2	50	50	100	50	25

See footnote at end of table.

TABLE 9.—*Approximate acreage, proportionate extent, and uses of soils in the year 1957*—Continued

Soil	County total	Percent	Cropland	Pasture	Woodland	Idle	Urban farmstead[1]
	Acres		*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
Louisburg complex, 6 to 10 percent slopes, eroded	1,350	1.0	200	100	850	100	100
Louisburg complex, 10 to 15 percent slopes, eroded	1,275	1.0	50	50	1,050	50	75
Louisburg stony complex, 10 to 40 percent slopes	1,770	1.4	50	100	1,400	150	70
Madison gravelly fine sandy loam, 2 to 6 percent slopes, eroded	3,850	3.0	1,000	300	1,100	1,100	350
Madison gravelly fine sandy loam, 6 to 10 percent slopes	315	.2	0	0	300	0	15
Madison gravelly fine sandy loam, 6 to 10 percent slopes, eroded	9,600	7.4	2,000	1,000	4,500	1,400	700
Madison gravelly fine sandy loam, 10 to 15 percent slopes	410	.3	0	0	400	0	10
Madison gravelly fine sandy loam, 10 to 15 percent slopes, eroded	6,900	5.4	300	700	5,000	400	500
Madison gravelly fine sandy loam, 15 to 25 percent slopes	2,300	1.8	0	0	2,200	0	100
Madison gravelly fine sandy loam, 15 to 25 percent slopes, eroded	11,600	9.0	0	300	10,400	200	700
Madison gravelly sandy clay loam, 2 to 6 percent slopes, severely eroded	550	.4	100	100	150	150	50
Madison gravelly sandy clay loam, 6 to 10 percent slopes, severely eroded	6,900	5.4	250	600	4,900	650	500
Madison gravelly sandy clay loam, 6 to 10 percent slopes, very severely eroded	310	.2	0	50	200	50	10
Madison gravelly sandy clay loam, 10 to 15 percent slopes, severely eroded	10,270	8.0	150	700	8,200	650	570
Madison gravelly sandy clay loam, 10 to 15 percent slopes, very severely eroded	2,600	2.0	0	0	2,400	100	100
Madison gravelly sandy clay loam, 15 to 25 percent slopes, severely eroded	1,350	1.0	0	250	900	150	50
Madison gravelly sandy clay loam, 15 to 25 percent slopes, very severely eroded	260	.2	0	0	250	0	10
Mecklenburg sandy loam, 6 to 10 percent slopes, eroded	260	.2	100	50	50	50	10
Molena loamy sand, 2 to 6 percent slopes	105	.1	50	50	0	0	5
Molena loamy sand, 6 to 10 percent slopes	155	.1	0	50	50	50	5
Musella clay loam, 6 to 10 percent slopes, eroded	1,370	1.1	100	50	800	350	70
Musella clay loam, 10 to 15 percent slopes, eroded	640	.5	50	50	400	100	40
Musella clay loam, 15 to 25 percent slopes, eroded	1,470	1.1	0	50	1,300	50	70
Musella stony clay loam, 6 to 10 percent slopes, eroded	210	.2	0	0	100	100	10
Musella stony clay loam, 10 to 15 percent slopes, eroded	420	.3	0	50	150	200	20
Musella stony clay loam, 15 to 25 percent slopes, eroded	210	.2	0	0	150	50	10
Musella stony fine sandy loam, 15 to 25 percent slopes	2,000	1.6	50	50	1,700	100	100
Rock outcrop	500	.4	------	------	------	------	------
State fine sandy loam, 0 to 6 percent slopes	205	.2	50	100	50	0	5
Wehadkee silty clay loam	1,650	1.3	0	0	1,600	0	50
Wickham fine sandy loam, 2 to 6 percent slopes, eroded	1,600	1.2	250	1,150	100	0	100
Wickham fine sandy loam, 6 to 10 percent slopes, eroded	215	.2	50	100	50	0	15
Wickham clay loam, 2 to 6 percent slopes, severely eroded	215	.2	50	100	50	0	15
Wickham clay loam, 6 to 10 percent slopes, severely eroded	160	.1	100	50	0	0	10
Wilkes sandy loam, 6 to 10 percent slopes, eroded	265	.2	50	50	100	50	15
Wilkes stony sandy loam, 10 to 15 percent slopes, eroded	530	.4	0	50	350	100	30
Water	1,240	1.0	------	------	------	------	------
Total	128,640	100.0	13,400	9,950	86,900	8,650	7,650

[1] Includes acreage in roads.

Alluvial Land

Alluvial land consists of layers of sediment that have been deposited on level or nearly level flood plains by water. The areas are subject to change as the result of the periodic overflow of streams. The soil materials in most areas have remained in place long enough, however, for plants to become established. The deposits are too recent for a soil profile to have had time to develop.

In Douglas County this land type is represented by Alluvial land, moderately well drained; Alluvial land, somewhat poorly drained; and Local alluvial land.

Alluvial land, moderately well drained (0 to 2 percent slopes) (Alm).—This miscellaneous land type is widely

distributed along small streams in the county. It consists of deep, moderately well drained, strongly acid mixed alluvium deposited on nearly level flood plains. Most of the alluvium has been moved only a few hundred yards from its source or, at most, only a few miles. The areas are flooded occasionally.

This land type occurs with Congaree, Chewacla, and Buncombe soils. In a few places it includes areas of these soils that are too small or too intricately mixed to be separated. The texture of Alluvial land, moderately well drained, is much more variable than that of the nearby soils.

This land type consists mainly of light yellowish-brown to light brownish-gray loamy sand and sandy loam. In many places, however, it has scattered layers throughout that range in texture from coarse sand to silty clay loam. Coarse mottles or splotches are common at depths below 24 inches.

The supplies of organic matter and available plant nutrients are low to medium in this land type. Crops grown on the areas respond well to fertilizer and commonly make moderate to high yields. Runoff is slow, and permeability and the rate of infiltration are rapid. The moisture-supplying capacity is high.

Because it is nearly level, and because permeability, tilth, and the rate of infiltration are generally favorable, Alluvial land, moderately well drained, is suited to sprinkler irrigation. A supply of water is nearby. The areas are also suitable for impounding water for farm ponds.

The land is suited to pasture and to a limited number of crops grown locally. It can be used for row crops every year if an occasional cover crop is grown to maintain the supply of organic matter and good soil tilth. (Capability unit IIw 2; woodland group 2.)

Alluvial land, somewhat poorly drained (0 to 2 percent slopes) (Alp).—This miscellaneous land type is more poorly drained and has a higher water table than Alluvial land, moderately well drained. It is also grayer, commonly overflows more frequently and for longer periods, and has a greater number of mottles nearer the surface. The areas are widely distributed along small streams in the county.

The supply of organic matter in this land type is low to moderately high, and the supply of available plant nutrients is low to medium. Crops grown on the areas respond well to fertilizer, and yields are usually moderate to high. Surface runoff is slow. Both the rate of infiltration and permeability are moderate to rapid, and the moisture-supplying capacity is high. Except in a few wet spots, tilth is generally good. Ditching is required to remove excess surface water and to improve internal soil drainage.

Because it is nearly level and permeability, tilth, and the rate of infiltration are generally favorable, Alluvial land, somewhat poorly drained, is suited to sprinkler irrigation. It has a supply of water nearby. The areas are also suitable for impounding water for farm ponds.

This land type is suited to pasture and to a limited number of crops grown locally. It can be used for cultivated crops every year if an occasional cover crop is included in the cropping system to maintain the supply of organic matter and good soil tilth. (Capability unit IIIw-2; woodland group 2.)

Local alluvial land (2 to 6 percent slopes) (Sne).—This miscellaneous land type consists of deposits of sandy loam or of materials of variable texture that have washed from nearbly slopes. The deposits range in depth from 10 to 20 inches. They overlie Madison, Appling, Lloyd, or Colfax soils that have slightly altered profiles. In most places the material that has washed in is similar to that in the original surface layer of the underlying soil, and it is difficult to determine which material is the alluvial material.

This land is deep, well drained to moderately well drained, and strongly acid. It has slightly concave slopes ranging from 2 to 6 percent. The original vegetation was oak, hickory, poplar, and pine.

The supply of organic matter is low to medium in this land, and the supply of available plant nutrients is medium. Tilth is good. Crops respond well to fertilizer, and yields are commonly moderate to high. Runoff is slow, and permeability and the rate of infiltration are moderate. The moisture-supplying capacity is high. Local alluvial land occurs in small areas throughout the county. If there is an adequate supply of water nearby, it is suited to sprinkler irrigation. It is suited to most of the crops grown locally and can be cultivated every year if cover crops are grown occasionally to help maintain the supply of organic matter and good soil tilth. (Capability unit I-1; woodland group 2.)

Altavista Series

The Altavista series consists of deep, moderately well drained, strongly acid, loamy soils formed on low stream terraces. The soils have slopes ranging from 2 to 6 percent, but slopes are commonly about 3 percent. Most areas have been cultivated and are now used for pasture or cultivated crops. The original vegetation was oak, hickory, poplar, gum, maple, and loblolly and shortleaf pines.

These soils occur with Augusta, Wickham, and Appling soils. The subsoil in the Altavista soils is not so gray as that of the Augusta soil nor so red as that of the Wickham soils. The Altavista soils have formed in old alluvium, and the Appling soils, in materials from weathered bedrock.

The supply of organic matter is low to medium in these soils, and the supply of available plant nutrients is low. Crops respond well to fertilizer.

Only one soil of this series—Altavista fine sandy loam, 2 to 6 percent slopes, eroded—is mapped in this county.

Altavista fine sandy loam, 2 to 6 percent slopes, eroded (AkB2).—This deep, moderately well drained soil occurs in small areas along the rivers and larger creeks in the county. It is on low stream terraces. A description of a profile, taken in a moist area, follows:

A_p 0 to 8 inches, pale-olive (5Y 6/3) fine sandy loam; weak, fine, granular structure; soft, very friable, or nonsticky; many plant roots; strongly acid; clear, wavy boundary; 5 to 9 inches thick.

B_1 8 to 20 inches, light olive-brown (2.5Y 5/4) sandy clay loam; moderate, fine, subangular blocky structure; friable; many fine roots; strongly acid; clear, wavy boundary; 10 to 16 inches thick.

B_2 20 to 35 inches, light yellowish-brown (2.5Y 6/4) silty clay loam with common, medium, distinct mottles of yellowish brown (10YR 5/8); moderate, medium, subangular blocky structure; hard, firm, or sticky; strongly acid; gradual, wavy boundary; 12 to 18 inches thick.

B_3 35 to 45 inches, olive-yellow (2.5Y 6/6) silty clay loam with many, medium, distinct mottles of pale olive (5Y 6/3) and yellowish brown (10YR 5/4); moderate, medium, subangular blocky structure; hard, firm, or sticky; strongly acid; gradual, wavy boundary; 6 to 12 inches thick.

C 45 to 55 inches, pale-olive (5Y 6/4) sandy clay loam with many, medium, distinct mottles of yellowish brown and yellowish red; moderate, medium, subangular blocky structure; friable; strongly acid.

A few pebbles that have been rounded by water are on the surface and throughout the profile. In places the texture of the B_2 and B_3 horizons is sandy clay loam.

Surface runoff is slow to medium. The rate of infiltration is moderate. Permeability is moderate to moderately slow, and the moisture-supplying capacity is moderately high.

A few areas of Altavista silt loam are included with this mapping unit. In these areas the plow layer is pale-olive to light yellowish-brown silt loam. A few areas of Augusta silt loam are also included. Here, the plow layer is silt loam and the subsoil contains many gray mottles.

Altavista fine sandy loam, 2 to 6 percent slopes, eroded, is suited to most of the crops grown locally, and yields are usually moderate to high. It needs to be kept in close-growing crops 1 year out of 2 or 3 to protect it from erosion and to maintain good soil tilth. (Capability unit IIe-2; woodland group 4.)

Appling Series

The Appling series consists of deep, well-drained, strongly acid soils that have a loamy surface layer and a subsoil of mottled clay. The soils have formed in materials from weathered granite schist, gneiss, and other acid igneous and metamorphic rocks. The original vegetation was oak, hickory, dogwood, and loblolly and shortleaf pines.

These soils occur with Madison, Louisburg, Helena, and Colfax soils. They have a coarser textured subsoil than the Madison soils and are less red and less micaceous. The Appling soils are deeper and have more distinct horizons than the Louisburg soils. They are deeper, better drained, and have a more friable subsoil than the Helena soils and are much better drained and are less gray than the Colfax soils.

The Appling soils are low in organic matter and in available plant nutrients. Crops grown on them respond well to fertilizer, and yields are usually moderate to high.

These soils occur mainly in large areas on a broad, rolling ridge between Winston and Lithia Springs. Other small areas are scattered throughout the county. About 53 percent of the total acreage of Appling soils in Douglas County is woodland, 30 percent is cultivated, and the rest is in pasture or idle.

Appling sandy loam, 2 to 6 percent slopes, eroded (AmB2).—This deep soil is well drained, but it has a clayey subsoil that is mottled yellow and red. A description of a profile, taken in a moist area, follows:

A_p 0 to 7 inches, yellowish-brown (10YR 5/6) sandy loam; weak, fine, granular structure; very friable; many roots, few pebbles; clear, smooth boundary; 5 to 9 inches thick.

B_1 7 to 11 inches, yellowish-red (5YR 5/8) sandy clay loam; moderate, fine and medium, subangular blocky structure; friable; many fine roots; strongly acid; gradual, wavy boundary; 2 to 5 inches thick.

B_2 11 to 24 inches, red (2.5YR 5/8) sandy clay with many, medium, prominent mottles of yellowish brown (10YR 5/8); moderate, medium, subangular blocky structure; friable to firm; thin, patchy films; gradual, wavy boundary; 8 to 16 inches thick.

B_3 24 to 37 inches, yellowish-red (5YR 5/8) sandy clay with many, medium, distinct mottles of red (2.5YR 5/8) and reddish yellow (7.5YR 6/6); moderate, medium, subangular blocky structure; friable; few mica flakes; strongly acid; gradual, wavy boundary; 12 to 22 inches thick.

C 37 to 61 inches +, commonly sandy loam or sandy clay loam from highly weathered granite and quartz mica schist.

The color of the A_p horizon ranges from dark grayish brown to yellowish brown. In places there are many quartz pebbles and cobblestones on the surface. The degree of erosion varies. In most places the entire plowed layer consists of the A horizon, but in some places about one-third of the plowed layer consists of materials from the B horizon. There are a few galled spots and shallow gullies. In many places the B_2 and B_3 horizons are yellowish brown with many coarse, prominent mottles.

Surface runoff is slow, and the rate of infiltration is moderate. Permeability is moderate, and the moisture-supplying capacity is moderately high.

In some places the texture of the surface soil is coarse sandy loam. A few areas of Louisburg soils are included with these soils. In these areas the B horizon is thin and discontinuous and the solum is commonly shallow.

Appling sandy loam, 2 to 6 percent slopes, eroded, is suited to most of the crops grown locally, and yields are usually moderate to high. To protect it from erosion and to maintain good tilth, it needs to be kept in close-growing crops 1 year out of 2 or 3. (Capability unit IIe-2; woodland group 1.)

Appling sandy loam, 6 to 10 percent slopes, eroded (AmC2).—This soil is similar to Appling sandy loam, 2 to 6 percent slopes, eroded, but it has stronger slopes. Runoff is a little more rapid, and the rate of infiltration is a little slower. This soil has a few galled spots and shallow gullies and a few U-shaped gullies that are 2 to 4 feet deep.

A few areas of this soil are severely eroded, and here the surface layer has a texture of sandy clay loam. A few areas in which the surface layer is coarse sandy loam and a few areas of Louisburg soils are also included. In the Louisburg soils the B horizon is thin and discontinuous and the solum is commonly shallow. A few small areas in which the subsoil is reddish brown are also included. In these areas the soil developed in terrace materials. Granite rock outcrops in a few places, and there are some gravelly areas.

This soil is suited to most of the crops grown locally. It needs to be kept in close-growing crops 2 years out of

3, however, to protect it from erosion and to maintain good tilth. (Capability unit IIIe–2; woodland group 1.)

Appling sandy loam, 10 to 15 percent slopes, eroded (AmD2).—This soil is about 6 inches shallower than Appling sandy loam, 2 to 6 percent slopes, eroded. Runoff is more rapid, and the rate of infiltration is slower. The soil has a few galled spots and shallow gullies and a few U-shaped gullies, 2 to 4 feet deep.

Included with this soil are a few severely eroded areas where the texture of the surface layer is sandy clay loam. In about 20 acres the soil is uneroded or only slightly eroded; here, the surface layer is sandy loam and is about 11 inches thick. A few areas of Louisburg soils are also included. The Louisburg soils have a thin and discontinuous B horizon, their solum is generally shallow, and there are a few rock outcrops.

Because of the strong slopes, rapid runoff, and serious hazard of erosion, Appling sandy loam, 10 to 15 percent slopes, eroded, needs to be kept in perennial vegetation a large part of the time. It is suited to most of the crops grown locally, but it needs to be kept in close-growing crops 3 years out of 4. (Capability unit IVe–1; woodland group 1.)

Appling sandy clay loam, 6 to 10 percent slopes, severely eroded (AnC3).—This severely eroded soil has a finer textured plow layer than Appling sandy loam, 2 to 6 percent slopes, eroded, and is about 6 to 10 inches shallower. Surface runoff is also more rapid, the rate of infiltration is slower, and the moisture-supplying capacity is lower. In addition, the soil has poorer tilth. The plow layer consists of yellowish-brown sandy clay loam to a depth of 5 to 7 inches, and is composed mainly of materials from the B horizon. There are many galled spots and shallow gullies and a few U-shaped gullies, 3 to 5 feet deep.

A few areas of Louisburg soils are included with this soil. In these areas the B horizon is thin and discontinuous, the solum is generally shallow, and there are a few rock outcrops.

The severe hazard of erosion, rapid runoff, and poor tilth make Appling sandy clay loam, 6 to 10 percent slopes, severely eroded, better suited to perennial vegetation than to other crops. It is suited to most of the crops grown locally but needs to be kept in close-growing crops 3 years out of 4. (Capability unit IVe–1; woodland group 4.)

Appling sandy clay loam, 10 to 15 percent slopes, severely eroded (AnD3).—This soil has a finer textured plow layer than Appling sandy loam, 2 to 6 percent slopes, eroded, and is about 8 to 10 inches shallower. Surface runoff is also more rapid, the rate of infiltration is much slower, and the moisture-supplying capacity is lower. In addition, the soil has much poorer tilth. The plow layer is yellowish-brown sandy clay loam to a depth of 5 to 7 inches, and is composed mainly of materials from the B horizon. There are many galled spots and shallow gullies and a few U-shaped gullies, 3 to 6 feet deep.

The strong slopes, rapid runoff, severe hazard of erosion, and poor tilth limit the suitability of this soil for crops. It is suited only to perennial vegetation or to trees. (Capability unit VIe–2; woodland group 4.)

Augusta Series

The Augusta series consists of deep, somewhat poorly drained, strongly acid soils that have a grayish-brown surface layer and a subsoil of mottled fine sandy clay loam. The soils have formed in old alluvium. The original vegetation was oak, hickory, maple, elm, ash, poplar, and pine.

These soils occur with Altavista, State, and Chewacla soils. They are more poorly drained, grayer, and more highly mottled than the Altavista and State soils. They have more distinct horizons than the Chewacla soils, which are on flood plains.

The supply of organic matter in the Augusta soils is low to medium. The supply of available plant nutrients is low; crops respond well if fertilizer is added. Yields are usually moderate to high. These soils commonly have good tilth, but ditching generally is needed to remove excess surface water and to improve internal soil drainage.

Only one soil of this series—Augusta silt loam—is mapped in this county. It occurs on low terraces along the larger streams. Most areas have been cultivated, but more than half is now pastured. The rest is used for corn or woodland.

Augusta silt loam (0 to 2 percent slopes) (Asl).—This deep, somewhat poorly drained soil occurs along the larger streams in the county. A description of a profile, taken in a moist area, follows:

A_p 0 to 7 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; gradual, wavy boundary; 5 to 8 inches thick.

A_3 7 to 13 inches, light brownish-gray (10YR 6/2), heavy fine sandy loam; weak, fine, granular and subangular blocky structure; friable; many fine roots; strongly acid; gradual, wavy boundary; 4 to 8 inches thick.

B_2 13 to 25 inches, pale-brown (10YR 6/3) fine sandy clay loam with common, fine, distinct mottles of light gray (2.5Y 7/2) and reddish yellow (7.5YR 7/8); moderate, medium, subangular blocky structure; friable to firm; strongly acid; gradual, wavy boundary; 10 to 16 inches thick.

B_3 25 to 33 inches, light-gray (10YR 7/2) fine sandy clay loam with common, medium mottles of pale brown and white; moderate, fine, subangular blocky and granular structure; friable; many fine mica flakes; strongly acid; diffuse, wavy boundary; 6 to 15 inches thick.

C 33 to 47 inches +, light-gray to white fine sandy loam; weak, fine, granular structure; very friable; many fine mica flakes and a few rounded pebbles; strongly acid.

The color of the surface soil ranges from brown to light grayish brown. The texture of the A_3 horizon ranges from silt loam to fine sandy clay loam. In some places the texture of the B horizon is silty clay loam, and in others it is fine sandy clay.

Runoff is very slow to slow in this soil. The rate of infiltration and permeability are moderate to moderately slow, and the moisture-supplying capacity is high.

A few areas of poorly drained Roanoke soils, which are not mapped separately in this county, are included with this soil. In these areas the B horizon is gray. A few areas of Augusta fine sandy loams are also included.

Augusta silt loam is suited to sprinkler irrigation. It can be used for a limited number of crops commonly grown in the county. (Capability unit IIIw-3; woodland group 2.)

Buncombe Series

The Buncombe series consists of deep, somewhat excessively drained, strongly acid, sandy soils of the flood plains. The soils are gently undulating. They have formed in recent alluvium washed from Louisburg, Louisa, Madison, Appling, and related soils. The native vegetation consisted of pine, oak, poplar, and gum.

These soils occur with Congaree soils and with mixed areas of Alluvial lands. They are much sandier throughout than the Congaree soils, and they have a more uniform profile than the Alluvial lands.

The Buncombe soils are low in organic matter and in available plant nutrients. Crops grown on them respond well to fertilizer, but the soils are so droughty that they are poorly suited to most crops. Yields are usually low to moderate.

In this county most areas of these soils have been cultivated. They are now used for corn or pasture.

Buncombe loamy sands, 0 to 6 percent slopes (Bfs).—These deep soils are somewhat excessively drained. A description of a profile, taken in a moist area, follows:

A 0 to 12 inches, olive-gray (5Y 4/2) or pale-olive (5Y 6/4, dry) loamy sand; weak, very fine, granular structure; loose or very friable; many plant roots; strongly acid; gradual, wavy boundary; 3 to 13 inches thick.

C 12 to 64 inches +, pale-yellow (2.5Y 7/4) loamy fine sand with common, coarse, faint mottles or splotches of light gray; weak, very fine, granular structure; loose or very friable; strongly acid.

In many places the soil profile is nearly uniform to a depth of 48 inches or more. The texture below the surface layer ranges from loamy sand to sand.

Surface runoff is very slow. Permeability and the rate of infiltration are rapid. The moisture-supplying capacity is low.

Because these soils are droughty, they are not suited to frequent cultivation. They are best kept in permanent vegetation, or a cropping system may be used that will add organic matter to the soil and thus increase the moisture-holding capacity. (Capability unit IVs-1; woodland group 2.)

Chewacla Series

The Chewacla series consists of deep, moderately well drained to somewhat poorly drained, strongly acid, loamy soils on flood plains. They have formed in recent alluvium washed from the Madison, Louisa, Appling, Louisburg, and similar soils. The original vegetation was poplar, beech, elm, gum, oak, and pine.

These soils occur with Congaree and Wehadkee soils and, to a lesser extent, with Buncombe soils. They are more poorly drained and have a grayer subsurface layer than the Congaree soils and are better drained and have a browner surface layer than the Wehadkee soils. The Chewacla soils are finer textured throughout than the Buncombe soils.

The supply of organic matter in the Chewacla soils is medium, and the supply of available plant nutrients is low to medium. The soils have good tilth, and crops respond well to fertilizer. The somewhat poor drainage and susceptibility to frequent overflow limit the number of crops that can be grown on these soils, but yields are usually moderate to high.

In this county the Chewacla soils occur in fairly large areas along the larger streams. Most of the acreage has been cleared, and about half of it is pastured or used for cultivated crops.

Chewacla soils (0 to 2 percent slopes) (Cfs).—These soils are moderately well drained to somewhat poorly drained. They occur along the larger streams in the county. A description of a profile of Chewacla silt loam, taken in a moist area, follows:

A_p 0 to 6 inches, dark-brown (7.5YR 4/4) silt loam; moderate, fine, granular structure; very friable; many plant roots and a few fine mica flakes; strongly acid; clear, smooth boundary; 4 to 9 inches thick.

C_1 6 to 14 inches, dark grayish-brown (2.5Y 4/2) silt loam; weak, fine, granular structure; very friable; many fine roots and a few fine mica flakes; strongly acid; diffuse, wavy boundary; 6 to 12 inches thick.

C_2 14 to 37 inches, dark grayish-brown (2.5Y 4/2) silt loam with common, medium, faint mottles of gray (N 5/); weak, fine, granular structure; very friable; few plant roots and small mica flakes; strongly acid; gradual, wavy boundary; 20 to 30 inches thick.

C_3 37 to 47 inches, mottled gray and brown sandy loam to silty clay loam that contains many slightly rounded pebbles.

The plow layer ranges in texture from silt loam to fine sandy loam. Recent sandy alluvial material, 4 to 8 inches thick, is on the surface in many places. Strata of sand or of silty clay loam occur in places throughout the profile. In some small areas the texture in most of the profile is fine sandy loam.

Surface runoff is slow, and the soils are high in moisture-supplying capacity. Permeability and the rate of infiltration are moderate. The soils have good tilth.

A few areas of Congaree soils are included with these soils. In these areas the profile is free of mottles to a depth of more than 24 inches. A few areas of Wehadkee soils are also included. Here, the profile is mottled within 4 to 5 inches of the surface.

The somewhat poor drainage and susceptibility to frequent overflow limit the suitability of the Chewacla soils for crops. They are suited to only a small number of crops, but yields are moderate to high. The soils are well suited to sprinkler irrigation, and nearby streams provide a source of water. If adequately drained and otherwise managed so that good soil tilth and an adequate supply of organic matter are maintained, the soils can be used for cultivated crops every year. (Capability unit IIIw-2; woodland group 2.)

Colfax Series

The soils of the Colfax series are moderately deep, somewhat poorly drained, and very strongly acid. They have a gray to brown surface layer of sandy loam and a mottled gray subsoil of sandy clay. The soils have formed in materials from weathered granite and gneiss that include local alluvium in places. The soils have slopes ranging from 2 to 6 percent, but in most places slopes are between 2 and 4 percent. In a few places the slopes are slightly convex. The original vegetation was poplar, willow, maple, gum, and beech.

These soils occur with Helena and Appling soils but are more poorly drained than the soils of either of these two series. The B horizon is not so fine textured nor so compact as that of the Helena soils, and the soils are grayer throughout than the Appling soils.

The Colfax soils contain a medium supply of organic matter and have a moderately high moisture-supplying capacity. Their somewhat poor drainage and low content of available plant nutrients, however, limit the crops to which they are suited. Yields are low to moderate.

Only one soil of this series—Colfax sandy loam, 2 to 6 percent slopes—is mapped in this county. This soil occurs around the heads of drainageways and on low interstream saddles or divides.

Colfax sandy loam, 2 to 6 percent slopes (CiB).—This soil is moderately deep and is somewhat poorly drained. It occurs in small areas throughout the county. A description of a profile, taken in a moist area, follows:

A_p 0 to 9 inches, very dark grayish-brown (10YR 3/2) to dark-gray (10YR 4/1) sandy loam; weak, medium, granular structure; very friable; many plant roots; strongly acid; clear, smooth boundary; 7 to 10 inches thick.

B_1 9 to 13 inches, light olive-gray (5Y 6/2) sandy clay loam with common, fine, distinct mottles of yellowish brown (10YR 5/8); weak, medium, subangular blocky structure; friable, but slightly sticky when wet; very strongly acid; gradual, smooth boundary; 3 to 7 inches thick.

B_2 13 to 25 inches, light olive-gray (5Y 6/2) sandy clay with many, medium, distinct mottles of brownish yellow (10YR 6/8); weak to moderate, medium, subangular blocky structure; friable, but sticky and plastic when wet; very strongly acid; diffuse, wavy boundary; 10 to 19 inches thick.

B_3 25 to 32 inches, coarsely mottled reddish-yellow and gray clay; moderate, medium, subangular blocky structure; sticky and plastic when wet; very strongly acid; gradual, wavy boundary; 5 to 13 inches thick.

C 32 to 45 inches +, mottled gray and reddish-yellow sandy loam; weak, medium, subangular blocky structure; very friable; highly disintegrated granite; strongly acid.

Recent local alluvium, 4 to 8 inches thick, covers the surface of the soil in a few places. In many places the texture of the B_2 and B_3 horizons is sandy clay loam.

Runoff is slow, and the rate of infiltration is moderate. Permeability is moderately slow, and the moisture-supplying capacity is high. Seepage water keeps this soil wet much of the time.

About 40 acres of Worsham sandy loam is included with the Colfax soils. In the included areas the B horizon is gray (10YR 6/1) to bluish-gray (5B 6/), plastic clay. The Worsham soils are not mapped separately in this county.

The wetness of Colfax sandy loam, 2 to 6 percent slopes, limits its suitability for crops. It is suited to only a limited number of crops, and yields are low to moderate. (Capability unit IIIw-3; woodland group 2.)

Congaree Series

The Congaree series consists of deep, well-drained soils that are strongly acid. The soils have formed in recent alluvium washed from Madison, Louisa, Appling, Louisburg, and similar soils. The original vegetation was oak, elm, gum, beech, poplar, and pine.

These soils occur with Chewacla, Wehadkee, and Buncombe soils and with areas of Alluvial land. They are browner and better drained than the Chewacla and Wedhadkee soils and are finer textured throughout than the Buncombe soils.

The supply of organic matter in these soils is medium, and the supply of available plant nutrients is medium to low. Tilth is very good. Although subject to occasional overflow, these soils are suited to a wide range of plants. Yields are usually high.

Only one mapping unit of this series—Congaree soils—occurs in this county. These soils occur in fairly large areas on the flood plains of the larger streams. Most of the acreage is pastured or used for cultivated crops.

Congaree soils (0 to 2 percent slopes) (Cng).—These deep, well-drained soils occur in fairly large areas along the larger streams in the county. A description of a profile of Congaree silt loam, which is representative of these soils, follows. This profile was taken in a moist area.

A 0 to 10 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, fine, granular structure; very friable; few fine mica flakes and many roots; strongly acid; gradual, smooth boundary; 6 to 15 inches thick.

C_1 10 to 35 inches, dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; few fine mica flakes and many fine roots; strongly acid; diffuse, wavy boundary; 18 to 30 inches thick.

C_2 35 to 50 inches, pale-brown (10YR 6/3), loose or nonsticky loamy fine sand.

The plow layer ranges in color from light grayish brown to reddish brown. The texture of the surface layer ranges from silt loam to fine sandy loam. Recent sandy alluvial material, 4 to 8 inches thick, covers the surface of the soils in many places. Strata of sand or of silty clay loam occur in places throughout the profile.

Runoff is slow, and the rate of infiltration is moderately rapid. Permeability is moderate. The soils are high in moisture-supplying capacity and have good tilth.

A few areas of Chewacla soils are included with these soils. In these areas the profile is generally mottled below a depth of 15 inches.

Although the Congaree soils are flooded occasionally, they are suited to many kinds of crops and yields are usually high. They are well suited to sprinkler irrigation, and the nearby streams provide a source of water. If managed so that good soil tilth and a good supply of organic matter are maintained, the soils can be used for cultivated crops every year. (Capability unit IIw-2; woodland group 2.)

Davidson Series

The Davidson series consists of deep, well-drained, acid soils that have a dark reddish-brown to dusky-red surface layer and a subsoil of dark-red clay. The soils have formed in materials from weathered diorite, hornblende gneiss, and other basic rocks. They contain a large amount of clay and little sand. The original vegetation consisted of oak, hickory, poplar, dogwood, and pine.

These soils occur with Lloyd, Musella, Wilkes, and Mecklenburg soils. They are darker, a little deeper, and contain less sand than the Lloyd soils and are much deeper and contain fewer stones than the Musella soils. They are also deeper and darker than the Wilkes soils

and deeper, darker, more friable, and less plastic than the Mecklenburg soils. The Wilkes soils formed in materials from weathered, mixed, acidic and basic rocks. Their profile is not so well developed as that of the Davidson soils.

The Davidson soils are low in organic matter and are low to medium in available plant nutrients. They can be tilled only within a narrow range of moisture content. Crops on these soils respond well to fertilizer, and yields are generally moderate to high. The high content of clay holds fertilizer in the soil and makes it available over a fairly long period of time.

In this county most areas of Davidson soils have been cultivated, but about one-fourth of the acreage is now idle. The soils have smooth slopes. They occur in small areas on stream divides, mainly in the northwestern part of the county. A few small areas are near State Highway 92, about 4 miles southeast of Douglasville.

Davidson loam, 2 to 6 percent slopes, eroded (DgB2).—This deep, well-drained soil is commonly called push land. It occurs in small areas on stream divides, mainly in the northwestern part of the county. A description of a profile, taken in a moist area, follows:

A_p 0 to 7 inches, dark reddish-brown (5YR 3/3) loam; moderate, fine, granular structure; very friable; many plant roots; medium acid; clear, smooth boundary; 5 to 10 inches thick.

B_1 7 to 11 inches, dark reddish-brown (2.5YR 3/4) clay loam; weak, fine, subangular blocky structure; friable; many roots; strongly acid; gradual, smooth boundary; 4 to 8 inches thick.

B_2 11 to 44 inches, dark-red (2.5YR 3/6) clay; weak and moderate, fine, subangular blocky structure; friable to firm; many roots and a few manganese concretions and partly weathered fragments of hornblende gneiss; very strongly acid; diffuse, wavy boundary; 20 to 60 inches thick.

B_3 44 to 50 inches +, dark-red (2.5YR 3/6) silty clay; moderate, fine, subangular blocky structure; friable; extremely acid; 6 to 24 inches thick.

In a few areas this soil contains pebbles of quartz and hornblende gneiss. In many areas the A and B horizons differ but little in color. The degree of erosion varies, but in most places the plow layer consists of material from the A horizon and extends downward approximately to the B horizon.

Surface runoff is slow to medium, and the rate of infiltration is slow to moderate. Permeability is moderate, and the moisture-supplying capacity is moderately high. The soil has fair to good tilth.

A few areas of Lloyd soils are included with this soil. In these areas the plow layer is not quite so dark as that of the Davidson soil and there is more sand throughout the profile. Also included are a few areas of Musella soils. In the areas of Musella soils, the B horizon is thin and discontinuous and the soil is shallow. In a few places the texture of the plow layer is clay loam.

If there is an adequate supply of water nearby, Davidson loam, 2 to 6 percent slopes, eroded, is generally well suited to sprinkler irrigation. It is very well suited to pasture and small grains and to alfalfa and other legumes. It is also well suited to most of the other crops grown locally. To protect it from erosion and to maintain good tilth, close-growing crops should be grown 1 year out of 2 or 3. (Capability unit IIe–1; woodland group 4.)

Davidson loam, 6 to 10 percent slopes, eroded (DgC2).—Because of the stronger slopes, runoff is more rapid on this soil than on Davidson loam, 2 to 6 percent slopes, eroded. The degree of erosion varies. In most places the entire plow layer consists of material from the A horizon, but, in many places about 2 inches of soil material from the B horizon is turned up when the soil is plowed. There are a few galled spots and shallow gullies.

Like Davidson loam, 2 to 6 percent slopes, eroded, this soil has a few areas of Lloyd and Musella soils included. In these areas the plow layer is not quite so dark colored as that of the Davidson soil and there is more sand throughout the profile. In the areas where Musella soils occur, the B horizon is thin and discontinuous and the soil is shallow. A few areas of Davidson clay loam are also included, and a few areas in which slopes are between 10 and 15 percent.

Davidson loam, 6 to 10 percent slopes, eroded, is suited to the same crops as Davidson loam, 2 to 6 percent slopes, eroded. It needs to be kept in close-growing crops more of the time, or 2 years out of 3. (Capability unit IIIe–1; woodland group 4.)

Davidson clay loam, 2 to 6 percent slopes, severely eroded (DhB3).—This soil has a finer textured surface layer than Davidson loam, 2 to 6 percent slopes, eroded. As a result, the rate of infiltration is slower and runoff is more rapid. The degree of erosion varies from place to place, but in most places more than half of the plow layer consists of materials from the B horizon. There are a few galled spots and shallow gullies.

A few areas of Musella soils are included with this soil. In these areas the B horizon is thin and discontinuous and the soil is shallow.

Davidson clay loam, 2 to 6 percent slopes, severely eroded, is suited to the same crops as Davidson loam, 2 to 6 percent slopes, eroded. It needs to be kept in close-growing crops a greater proportion of the time, or 2 years out of 3. (Capability unit IIIe–1; woodland group 4.)

Davidson clay loam, 6 to 10 percent slopes, severely eroded (DhC3).—This soil has stronger slopes and a finer textured surface layer than Davidson loam, 2 to 6 percent slopes, eroded. The rate of infiltration is slower, and runoff is more rapid. The degree of erosion varies, but in most places more than half of the plow layer consists of materials from the B horizon. In many places nearly all of the plow layer is made up of materials from that horizon. The soil has many galled spots and shallow, V-shaped gullies. There are also a few gullies 2 to 4 feet deep.

A few areas of Musella soils are included with this soil. In these areas the B horizon is thin and discontinuous and the soil is shallow.

Davidson clay loam, 6 to 10 percent slopes, severely eroded, has poorer tilth than Davidson loam, 2 to 6 percent slopes, eroded. Although it is suited to most of the crops grown locally, a good stand is difficult to establish because a crust forms rapidly on the soil. To give protection from erosion and to improve tilth, close-growing crops should be grown 2 years out of 3. (Capability unit IIIe–1; woodland group 4.)

Davidson clay loam, 10 to 15 percent slopes, very severely eroded (DhD4).—Stronger slopes and a finer textured surface layer cause this soil to have more rapid

runoff than Davidson loam, 2 to 6 percent slopes, eroded. The rate of infiltration is also slower. Generally, the surface layer consists of materials from the lower part of the B horizon. There are many V-shaped gullies, most of which are shallow, but there are a few gullies 2 to 5 feet deep. The soil is generally less than 30 inches thick.

A few areas of Musella soil are included with this soil. In these areas the B horizon is thin and discontinuous, there are many cobblestones and other stones, and the soil is shallow. In many places the texture of the surface layer is clay.

The strong slopes, rapid runoff, very severe erosion hazard, and poor tilth limit the suitability of Davidson clay loam, 10 to 15 percent slopes, very severely eroded, to use for trees or other perennial vegetation. (Capability unit VIe-2; woodland group 8.)

Gullied Land

Gullied land (Gul).—This miscellaneous land type consists of small areas of land from which most of the soil material has been removed. In more than half of the acreage, there is an intricate pattern of deep and shallow gullies. In many places these gullies have cut into the weathered mica schist or into the granite, hornblende, diorite, or gneiss. The soil material remaining between the gullies commonly has a texture of sandy clay loam. It is mainly from the lower part of the B horizon of the original soil. Slopes generally are between 6 and 15 percent.

The supply of organic matter and the supply of available plant nutrients are low in Gullied land. Tilth is poor, and stony areas are common. Plants make extremely slow growth. Surface runoff is very rapid. Permeability is slow, and both the rate of infiltration and the moisture-supplying capacity are low.

This miscellaneous land type is not suitable for agriculture. It can be managed, however, so that it will afford watershed protection or will produce a small amount of food and cover for wildlife. Establishing vegetation on this land requires great care and skill. (Capability unit VIIIs-1.)

Helena Series

The soils of the Helena series are moderately deep, moderately well drained to somewhat poorly drained, and strongly acid. They have a surface layer of sandy loam and a subsoil of sandy clay mottled with brown, yellow, gray, and red. The soils are on the lower parts of slopes. They have formed mainly in materials from weathered aplitic granite, gneiss, and other acid igneous and metamorphic rocks. To a much lesser extent, the parent material consisted of materials weathered from diorite, hornblende gneiss, and other basic rocks. The original vegetation consisted of oak, hickory, gum, poplar, beech, and pine.

These soils occur with Appling, Wilkes, and Louisburg soils. They have a grayer B horizon than the Appling soils and are less friable and more plastic than those soils. They have a thicker B horizon and are deeper than the Wilkes and Louisburg soils and are finer textured than the Louisburg soils.

The supply of organic matter is low to medium in the Helena soils, and the soils are low in available plant nutrients. Crops on these soils respond well to fertilizer. The soils are suited to only a limited number of crops, and yields are generally low to moderate.

In this county most areas of these soils have been cultivated. Now, about 70 percent of the acreage is in trees and most of the rest is in pasture. The Helena soils are in small areas in the northwestern part of the county. A few small areas are scattered throughout the rest of the county.

Helena sandy loam, 2 to 6 percent slopes, eroded (HYB2).—This soil is moderately deep and is somewhat poorly drained. A description of a profile, taken in a moist area, follows:

A_p 0 to 6 inches, dark grayish-brown (2.5Y 4/2) sandy loam; weak, fine, granular structure; very friable; many plant roots; strongly acid; abrupt, smooth boundary; 5 to 9 inches thick.

B_2 6 to 15 inches, yellowish-brown (10YR 5/6) sandy clay with many, fine, faint mottles of light yellowish-brown (10YR 6/4); strong, medium and coarse, angular to subangular blocky structure; very firm to extremely firm; prominent clay films on surfaces of peds; strongly acid; gradual, wavy boundary; 7 to 20 inches thick.

B_3 15 to 23 inches, yellowish-brown (10YR 5/6) clay with many, medium, prominent mottles of gray, very pale brown, and light red; strong, medium, angular to subangular blocky structure; very firm when moist, sticky to very sticky when wet; strongly acid; diffuse, wavy boundary; 6 to 15 inches thick.

C 23 to 80 inches +, highly mottled yellowish-brown, very pale brown, and light-red sandy clay loam and highly weathered aplitic granite.

The color of the plow layer ranges from dark grayish brown to gray. In many places 10 to 15 percent of the soil material in the plow layer is coarse sand and fine gravel. A few fragments of partly weathered granite are on or near the surface in some places, and there is a thin and discontinuous B_1 horizon of sandy clay loam in some places. The degree of erosion varies, but in most places the plow layer is barely within the A horizon.

Runoff is slow to medium in this soil, and the rate of infiltration is moderately rapid. Permeability is moderately slow, and the moisture-supplying capacity is moderate. The soil has good tilth.

A few areas of Appling soils are included with this soil. In these areas the soil is deep and the B horizon is friable. A few areas of Louisburg soils, where the soil is shallow and the B horizon is thin and discontinuous, are also included.

Helena sandy loam, 2 to 6 percent slopes, eroded, is suited to only a limited number of crops. A cropping system is needed in which the soil is kept in close-growing vegetation 1 year out of 2, or 2 years out of 4. (Capability unit IIe-3; woodland group 4.)

Helena sandy loam, 6 to 10 percent slopes, eroded (HYC2).—This soil has more rapid surface runoff than Helena sandy loam, 2 to 6 percent slopes, eroded, and it is a little more eroded. It is moderately well drained to somewhat poorly drained.

A few areas of Appling soils are mapped with this soil. In these included areas the soil is deep and the B horizon is friable. A few areas of Louisburg soils are also included. Here, the soil is shallow and the B horizon is thin and discontinuous.

Helena sandy loam, 6 to 10 percent slopes, eroded, is suited to a limited number of crops. To protect it from erosion and to improve tilth, it should be kept in close-growing crops 2 years out of 3. (Capability unit IIIe-3; woodland group 4.)

Helena soils, 6 to 10 percent slopes, severely eroded (HYC3).—These soils have more rapid surface runoff than Helena sandy loam, 2 to 6 percent slopes, eroded, and the texture of the plow layer is more variable. The plow layer ranges in texture from sandy clay loam to sandy loam and consists of materials from both the A and B horizons. The soils are moderately well drained to somewhat poorly drained. They vary in degree of erosion.

A few areas of Appling soils are included with these soils. In these areas the soil is deep and the B horizon is friable. A few areas of Louisburg soils are also included. Here, the soil is shallow and the B horizon is thin and discontinuous.

Helena soils, 6 to 10 percent slopes, severely eroded, are best kept in perennial vegetation. Cultivated crops can be grown to a limited extent, but the soils need to be kept in close-growing crops 3 years out of 4. (Capability unit IVe-2; woodland group 4.)

Lloyd Series

The Lloyd series consists of deep, well-drained, strongly acid soils that have a dark-brown or reddish-brown surface layer and a subsoil of dark-red clay. The soils have formed mainly in materials weathered primarily from diorite, hornblende schist, and other basic igneous and metamorphic rocks. To a lesser extent, their parent material was mica schist, gneiss, and other acid igneous and metamorphic rocks. The Lloyd soils have slopes ranging from 2 to 25 percent. The original vegetation was oak, hickory, poplar, dogwood, and pine.

These soils occur with Davidson, Musella, Wilkes, and Madison soils. Their surface layer is lighter colored than that of the Davidson soils; they have more sand throughout the profile. The Lloyd soils are deeper, have a thicker B horizon, and are less stony than the Musella soils and are deeper, redder, and have a much thicker B horizon than the Wilkes soils. They are darker, less micaceous, and a little deeper than the Madison soils.

The supply of organic matter is low in the Lloyd soils, and the supply of available plant nutrients is low to medium. Crops on these soils respond well to fertilizer, and yields are usually moderate to high.

In Douglas County the Lloyd soils occur in small areas, mainly on stream divides in the northwestern part of the county. A few small areas occur in other parts. The soils generally have been cultivated. More than half of the acreage is in pine trees.

In the areas where slopes are less than 15 percent and erosion is less than very severe, the Lloyd soils are well suited to alfalfa and to most other legumes, small grains, and pasture. They are also well suited to most of the other crops commonly grown in the county.

Lloyd sandy loam, 2 to 6 percent slopes, eroded (LdB2).—This soil is deep and well drained. A description of a profile, taken in a moist area, follows:

A_p 0 to 7 inches, dark-brown (10YR 4/3) to brown (10YR 5/3, dry) sandy loam; weak, fine, granular structure; very friable; many fine roots and a few quartz pebbles; strongly acid; clear, smooth boundary; 5 to 9 inches thick.

B_1 7 to 10 inches, dark reddish-brown (5YR 3/4) to strong-brown (7.5YR 5/6, dry) sandy clay loam; moderate, fine, subangular blocky to weak, fine, granular structure; friable; many fine roots and a few quartz pebbles; very strongly acid; gradual, smooth boundary; 3 to 7 inches thick.

B_{21} 10 to 24 inches, dark-red (2.5YR 3/6) to yellowish-red (5YR 4/8, dry) clay; moderate, fine and medium, subangular blocky structure; friable when moist, very hard when dry; few fine roots and pebbles; very strongly acid; diffuse, wavy boundary; 10 to 20 inches thick.

B_{22} 24 to 36 inches, dark-red (2.5YR 3/6) to yellowish-red (5YR 4/8, dry) clay; moderate, medium, subangular and angular blocky structure; friable when moist, very hard when dry; few fine roots and pebbles; very strongly acid; diffuse, wavy boundary; 8 to 14 inches thick.

B_3 36 to 48 inches, red (2.5YR 4/6) clay with a few medium, prominent, strong-brown (7.5YR 5/6) mottles of weathered diorite; weak and moderate, medium, subangular blocky structure; friable when moist, hard when dry; few fine mica flakes; very strongly acid; diffuse, wavy boundary; 8 to 20 inches thick.

C 48 to 51 inches +, mottled strong-brown, reddish-yellow and red clay loam and highly weathered hornblende gneiss or diorite.

The color of the plow layer ranges from dark brown to reddish brown, and there are a few gravelly areas. In most profiles the B_{21} and B_{22} horizons contain a noticeable amount of sand. The texture of the B_3 horizon ranges from silty clay to silty clay loam. The degree of erosion varies, but in most places the plow layer is barely within the A horizon.

Runoff is slow to medium. Permeability and the rate of infiltration are moderate, and the moisture-supplying capacity is moderately high. The soil commonly has good tilth.

A few areas of Davidson soils are included with this soil. In these areas the plow layer is finer textured than in the Lloyd soils, the soil is darker colored, and the content of sand is lower. A few areas of Madison soils and of a Lloyd loam are also included. In the areas of Madison soils, the profile is highly micaceous throughout.

Lloyd sandy loam, 2 to 6 percent slopes, eroded, is generally well suited to sprinkler irrigation if an adequate supply of water is nearby. It is well suited to pasture and to small grains, legumes, and most other crops grown locally. To protect it from erosion and to maintain good tilth, the soil needs to be kept in close-growing crops 1 year out of 2 or 3. (Capability unit IIe-1; woodland group 1.)

Lloyd sandy loam, 6 to 10 percent slopes, eroded (LdC2).—This soil has more rapid runoff than Lloyd sandy loam, 2 to 6 percent slopes, eroded, and is slightly more eroded. The plow layer is 5 to 6 inches thick and commonly contains a little material from the B horizon. There are a few galled spots and shallow gullies.

A few areas of Davidson soils are included with this soil. In these areas the texture of the plow layer is finer, the soil is darker colored, and the content of sand is lower than in the Lloyd soil. A few areas of Madison soils and a Lloyd loam and a Lloyd clay loam are also included. In the areas of Madison soils, the profile is highly micaceous throughout.

Lloyd sandy loam, 6 to 10 percent slopes, eroded, is suited to most of the crops grown locally. To protect it

from erosion and to maintain good tilth, the soil should be kept in close-growing crops 2 years out of 3. (Capability unit IIIe-1; woodland group 1.)

Lloyd sandy loam, 15 to 25 percent slopes, eroded (LdE2).—This soil has much stronger slopes and more rapid runoff than Lloyd sandy loam, 2 to 6 percent slopes, eroded. It is also more eroded, and water infiltrates a little more slowly. The surface layer is commonly 5 to 6 inches thick, and the solum is commonly about 30 inches thick. There are a few galled spots, shallow gullies, and V-shaped gullies 2 to 5 feet deep.

A few areas of Madison soils are included with this soil. In these areas the soil is highly micaceous throughout. A few areas of Musella soils are also included. Here, the B horizon is thin and discontinuous, the solum is shallow, and there are stones in many places.

Because of the strong slopes and rapid runoff, Lloyd sandy loam, 15 to 25 percent slopes, eroded, is limited in its suitability for crops. It is best kept in perennial vegetation. (Capability unit VIe-2; woodland group 1.)

Lloyd clay loam, 2 to 6 percent slopes, severely eroded (LeB3).—This soil has a finer textured surface layer than Lloyd sandy loam, 2 to 6 percent slopes, eroded, and water infiltrates more slowly. The degree of erosion varies, but in most places more than half of the plow layer is made up of material from the B horizon. There are a few galled spots and shallow gullies.

A few areas of Davidson soils are included with this soil. In these areas the plow layer is darker colored than that of the Lloyd soil and there is less sand throughout the profile. A few areas of a moderately eroded Lloyd loam are also included.

Lloyd clay loam, 2 to 6 percent slopes, severely eroded, can be worked only within a narrow range of moisture content. The large amount of clay in the surface layer ties up the fertilizer and makes it available over a relatively long period of time. The soil is suited to most of the crops grown locally. To protect it from erosion and to improve tilth, it should be kept in close-growing crops 2 years out of 3. (Capability unit IIIe-1; woodland group 4.)

Lloyd clay loam, 6 to 10 percent slopes, severely eroded (LeC3).—This soil has a finer textured surface layer than Lloyd sandy loam, 2 to 6 percent slopes, eroded. Runoff is more rapid, and the rate of infiltration is slower. The degree of erosion varies, but in most places more than half of the plow layer is made up of materials from the B horizon. In this soil there are numerous galled spots and shallow gullies and a few V-shaped gullies that are 2 to 4 feet deep.

A few areas of Davidson soils are included with this soil. In these areas the plow layer is darker colored than that of the Lloyd soil and there is less sand throughout the profile. A few areas of a moderately eroded Lloyd loam are also included.

Because of the fine texture of the plow layer, Lloyd clay loam, 6 to 10 percent slopes, severely eroded, can be worked only within a narrow range of moisture content. The large amount of clay in the surface layer ties up the fertilizer and makes it available over a relatively long period of time. This soil is suited to most of the crops grown locally. Getting a stand established is a problem, however, because the soil crusts over rapidly. To protect it from erosion and to improve tilth, the soil should be kept in close-growing crops 2 years out of 3. (Capability unit IIIe-1; woodland group 4.)

Lloyd clay loam, 6 to 10 percent slopes, very severely eroded (LeC4).—This soil has a finer textured surface layer and a thinner solum than Lloyd sandy loam, 2 to 6 percent slopes, eroded. Runoff is more rapid, and the rate of infiltration is slower. In most of the acreage, the plow layer is in the lower B horizon and there are many galled spots and shallow gullies. A few V-shaped gullies are 2 to 5 feet deep.

A few areas of Musella soils are included with this soil. In these areas the solum is shallow, the B horizon is thin and discontinuous, and there are many stones.

Because of the fine texture of the plow layer, Lloyd clay loam, 6 to 10 percent slopes, very severely eroded, can be tilled only within a narrow range of moisture content. It is best kept in perennial vegetation. If the soil is kept in close-growing crops 3 years out of 4, it can be used for most of the crops grown locally. (Capability unit IVe 1; woodland group 8.)

Lloyd clay loam, 10 to 15 percent slopes, severely eroded (LeD3).—This soil has a finer textured surface layer and a thinner solum than Lloyd sandy loam, 2 to 6 percent slopes, eroded. Water infiltrates more slowly. The degree of erosion varies, but in most places the plow layer is made up of material from the B horizon. There are numerous galled spots and shallow gullies and a few V-shaped gullies 2 to 4 feet deep.

A few areas of Davidson soils are included with this soil. In these areas the plow layer is darker colored than that of the Lloyd soil and there is less sand throughout the profile.

Because of the fine texture of the plow layer, Lloyd clay loam, 10 to 15 percent slopes, severely eroded, can be tilled only within a narrow range of moisture content. The soil is best kept in perennial vegetation. It is suited, however, to most crops grown locally if a cropping system is used that includes close-growing vegetation 3 years out of 4. (Capability unit IVe-1; woodland group 4.)

Lloyd clay loam, 10 to 15 percent slopes, very severely eroded (LeD4).—This soil has a finer textured surface layer and a thinner solum than Lloyd sandy loam, 2 to 6 percent slopes, eroded. Runoff is much more rapid, and the rate of infiltration is slower. In most of the acreage, the plow layer is within the lower B horizon and there are many galled spots and V-shaped gullies. Some of the gullies are 2 to 5 feet deep.

A few areas of Musella soils are included with this soil. In these areas the B horizon is thin and discontinuous and there are many stones.

Lloyd clay loam, 10 to 15 percent slopes, very severely eroded, is not suited to tilled crops. It is suited only to perennial vegetation. (Capability unit VIe-2; woodland group 8.)

Louisa Series

The Louisa series consists of shallow, somewhat excessively drained, strongly acid soils that have a thin and discontinuous B horizon. The soils have formed in materials weathered from mica schist. They are on the narrow crests of ridges, on the sharp breaks of slopes, or on steep slopes adjoining drainageways. The soils have slopes ranging from 10 to 40 percent, but in about two-

thirds of the acreage slopes are between 15 and 25 percent.

The Louisa soils occur with Madison soils. They have a thinner B horizon and are shallower than the Madison soils.

The supply of organic matter is medium to low in the Louisa soils. The soils are low in available plant nutrients and in moisture-supplying capacity.

In this county the Louisa soils occur in large areas near the Chattahoochee River. They are poorly suited to either crops or pasture, but they are moderately well suited to loblolly and shortleaf pines and to plants that provide shelter and food for wildlife. More than 95 percent of the acreage is in trees, but a few acres are in crops and pasture.

Louisa fine sandy loam, 15 to 25 percent slopes (LjE).—This shallow, somewhat excessively drained soil has a thin and discontinuous B horizon. A description of a profile, taken in a moist area, follows:

A_{00} 1½ inches to ½ inch, partly decayed leaves, twigs, and pine needles; 0 to 2 inches thick.

A_0 ½ to 0 inch, very dark gray, decayed leaves, pine needles, and twigs; 0 to 1 inch thick.

A_1 0 to 2 inches, dark grayish-brown (2.5Y 4/2) fine sandy loam; moderate, fine, granular structure; very friable; contains about 15 percent partly decayed organic matter and plant roots; strongly acid; abrupt, smooth boundary; 1 to 3 inches thick.

A_2 2 to 8 inches, brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; many mica flakes and some fragments of quartz mica schist; strongly acid; clear, smooth boundary; 5 to 9 inches thick.

B_2 8 to 11 inches, yellowish-red (5YR 5/8) sandy clay loam; moderate, fine and medium, subangular blocky structure; friable; many mica flakes; strongly acid; gradual, wavy boundary; 0 to 4 inches thick.

B_3 11 to 16 inches, red (2.5YR 4/8) silty clay; moderate, medium, subangular blocky structure; friable; many mica flakes and fragments of weathered mica schist; strongly acid; diffuse, wavy boundary; 4 to 9 inches thick.

C 16 to 48 inches +, sandy loam and highly weathered mica schist.

The amount of organic matter in the A_1 horizon varies. The B_3 horizon ranges in color from red to reddish yellow and in texture from clay to silty clay loam. The mica schist in the C horizon is commonly weathered to depths of many feet.

Surface runoff is rapid, and the moisture-supplying capacity is low in this soil. Both permeability and the rate of infiltration are moderately rapid.

A few small areas of Madison gravelly fine sandy loam, 15 to 25 percent slopes, eroded, have been mapped with this soil. In these included areas the B horizon is about 15 inches thick. A few gravelly and cobbly areas of Louisa soils have also been included.

Louisa fine sandy loam, 15 to 25 percent slopes, is not suited to tilled crops. It is suited only to woodland and pasture. (Capability unit VIe–3, woodland group 5.)

Louisa fine sandy loam, 10 to 15 percent slopes (LjD).—This soil is shallow and somewhat excessively drained. It has a thin and discontinuous B horizon. The soil is similar to Louisa fine sandy loam, 15 to 25 percent slopes, but has milder slopes. Runoff is rapid, and there is a serious hazard of erosion if the soil is cropped.

A few areas of Madison soils are mapped with this soil and occupy about 10 to 12 percent of its total acreage. In these areas the B horizon is about 15 inches thick.

Louisa fine sandy loam, 10 to 15 percent slopes, is limited in suitability to a small number of crops. It is better suited to trees, pasture, and hay than to cultivated crops and should be cultivated no oftener than 1 year out of 4. (Capability unit IVe–4; woodland group 5.)

Louisa fine sandy loam, 10 to 15 percent slopes, eroded (LjD2).—The surface layer of this soil is slightly finer textured and more reddish than that of Louisa fine sandy loam, 15 to 25 percent slopes, and it contains less organic matter. The plow layer is brown to yellowish-red fine sandy loam. The soil has a few galled spots and shallow gullies, and there are a few U-shaped gullies, 3 to 4 feet deep. Runoff is rapid, and the soil is somewhat excessively drained.

A few severely eroded areas, in which the surface layer is yellowish-red to red sandy clay loam, are mapped with this soil. A few areas of Madison soils are also included. In the areas of Madison soils, the B horizon is only about 15 inches thick.

Louisa fine sandy loam, 10 to 15 percent slopes, eroded, is suitable for only a small number of crops. To protect it from erosion, keep the soil in perennial vegetation 3 years out of 4. (Capability unit IVe–4; woodland group 5.)

Louisa fine sandy loam, 15 to 25 percent slopes, eroded (LjE2).—This soil has a redder, slightly finer textured surface layer and a thinner solum than Louisa fine sandy loam, 15 to 25 percent slopes. It also has more rapid runoff, a slower rate of infiltration, and a little lower moisture-supplying capacity. There are a few galled spots and shallow gullies and a few U-shaped gullies, 3 to 6 feet deep.

A few severely eroded areas are mapped with this soil. In these areas the plow layer is yellowish-red to red sandy clay loam to depths of 4 or 5 inches. A few small areas of Madison soils are also included. In the areas of Madison soils, the B horizon is about 15 inches thick.

Louisa fine sandy loam, 15 to 25 percent slopes, eroded, is not suited to cultivated crops. It needs to be kept in trees or pasture. (Capability unit VIe–3; woodland group 5.)

Louisa fine sandy loam, 25 to 40 percent slopes (LjF).—This soil is similar to Louisa fine sandy loam, 15 to 25 percent slopes, but it has stronger slopes and is slightly shallower. It also has a greater number of stones on or near the surface. Runoff is rapid, drainage is somewhat excessive, and the moisture-supplying capacity is low.

This soil has limited suitability for crops. It is suited only to trees and should be kept as woodland. (Capability unit VIIe–2; woodland group 5.)

Louisburg Series

The Louisburg series consists of shallow, somewhat excessively drained, strongly acid soils that have a surface layer of loamy sand and a thin and discontinuous B horizon. Bedrock is at depths of 12 to 36 inches. The soils are on broad, rolling divides and in areas where slopes are steep. They have formed in materials weathered from granite. The original vegetation was oak, hickory, dogwood, and pine.

These soils occur with Appling, Louisa, and Wilkes soils. They are shallower and have a thinner B horizon

than the Appling soils. They are similar to the Louisa and Wilkes soils, but the Louisa soils formed in materials from weathered mica schist, and the Wilkes soils, in materials weathered from mixed acidic and basic rocks.

The supply of organic matter is low in the Louisburg soils. The soils are also low in available plant nutrients and in moisture-supplying capacity. Crops respond well to fertilizer, but the effects of the fertilizer do not last long. Yields are commonly low to moderate. The soils are droughty and are poorly suited to crops.

In this county large areas of Louisburg soils occur on ridgetops and in sloping areas between Winston and Lithia Springs. Small areas occur throughout the county.

Louisburg complex, 2 to 6 percent slopes, eroded (LlB2).—The soils of this complex are shallow and somewhat excessively drained. A description of a profile, taken in a moist area, follows:

A_p 0 to 7 inches, pale-olive (5Y 6/4) loamy sand; weak, fine, granular structure; loose or very friable; many small roots; strongly acid; clear, wavy boundary; 2 to 8 inches thick.

B_2 7 to 13 inches, strong-brown (7.5YR 5/8) sandy clay loam; moderate, fine and medium, subangular blocky structure; friable; many small roots; strongly acid; gradual, wavy boundary; 3 to 8 inches thick.

B_3 13 to 18 inches, yellowish-brown (10YR 5/8) sandy clay loam with many, medium, prominent mottles of yellowish red (5YR 4/8); moderate, fine and medium, subangular blocky structure; slightly hard when dry, friable when moist, and slightly sticky when wet; strongly acid; clear, wavy boundary; 0 to 8 inches thick.

C 18 to 27 inches, yellowish-brown (10YR 5/8) loamy coarse sand, highly weathered and decomposed granite; 2 inches to several feet thick.

D_r 27 inches +, unweathered granite.

The texture of the plow layer ranges from sandy loam to loamy sand in these soils, but loamy sand is predominant. In some places the B horizon is pale yellow or red, and it is absent in some places. The depth to bedrock ranges from less than 18 inches to more than 30 inches within a distance of only a few feet.

A few areas of Appling soils are mapped with the soils in this complex. In these areas the soil is deeper than in the Louisburg soils and the B horizon is more than 15 inches thick. A few stony areas and a few areas of rock outcrops are also included.

Runoff is slow in Louisburg complex, 2 to 6 percent slopes, eroded, and permeability and the rate of infiltration are rapid. The moisture-supplying capacity is low. The soil has good tilth. Crops respond well to fertilizer.

The soils of this complex are limited in suitability to a very small number of crops. They can be cultivated if they are kept in close-growing crops 2 years out of 3. (Capability unit IIIe-5; woodland group 3.)

Louisburg complex, 6 to 10 percent slopes, eroded (LlC2).—The soils of this complex have slightly greater surface runoff and are a little more eroded than the soils of Louisburg complex, 2 to 6 percent slopes, eroded (fig. 4).

A few areas of Appling soils are mapped with these soils. In the included areas the B horizon is more than 15 inches thick and the solum is thicker than that of the Louisburg soils. A few small, stony areas and areas of rock outcrops are also included.

The low moisture-supplying capacity limits the suitability of the soils in Louisburg complex, 6 to 10 percent slopes, eroded, to a small number of crops. Cultivated crops can be grown safely only 1 year out of 4. (Capability unit IVe-4; woodland group 3.)

Figure 4.—**Profile of Louisburg complex, 6 to 10 percent slopes, eroded. Loose stones have been picked up and piled along the edge of the field next to the road ditch. The ruler is 27 inches long.**

Louisburg complex, 10 to 15 percent slopes, eroded (LlD2).—The soils of this complex have more rapid runoff and are more eroded than the soils of Louisburg complex, 2 to 6 percent slopes, eroded. They also have a greater number of rock outcrops and stones, and their moisture-supplying capacity is lower.

A few areas of Appling soils are mapped with these soils. In these areas the B horizon is more than 15 inches thick and the solum is thicker than that of the Louisburg soils.

The strong slopes and low moisture-supplying capacity limit the suitability of the soils in Louisburg complex, 10 to 15 percent slopes, eroded, to a small number of crops. Cultivated crops should be grown only 1 year out of 4. (Capability unit IVe-4; woodland group 3.)

Louisburg stony complex, 10 to 40 percent slopes (LmE).—The soils of this complex have more rapid surface runoff and a greater number of rock outcrops and stony areas than the soils of Louisburg complex, 2 to 6 percent slopes, eroded. In some places areas of rock outcrops occupy as much as one-quarter acre. In many places slightly weathered fragments of granite are on the surface and throughout the profile.

A few areas of Appling soils are mapped with the soils of this complex. In these areas the B horizon is

more than 15 inches thick and the solum is thicker than that of the Louisburg soils.

The soils of Louisburg stony complex, 10 to 40 percent slopes, are too stony and droughty for cultivated crops. They are best kept in pine trees. (Capability unit VIIe–2; woodland group 3.)

Madison Series

The Madison series consists of deep, well-drained, strongly acid soils that have a loamy surface layer and a subsoil of red clay. The soils have formed in materials weathered from mica schist. They occur on broad, smooth, interstream ridges or in areas adjoining drainageways. The original vegetation was oak, hickory, pine, and poplar.

These soils occur with Louisa and Appling soils. They have a redder B horizon and are more micaceous throughout than the Appling soils and are deeper and have a thicker B horizon than the Louisa soils.

The supply of organic matter in the Madison soils is low to moderately high, and the soils are moderately low in available plant nutrients. Permeability is moderate, and the moisture-supplying capacity is moderately high.

In this county the Madison soils are more extensive than other soils. They occupy most of the southwestern quarter of the county and occur in other large areas throughout the rest of the county. The less sloping areas that are not severely eroded are suited to most of the crops grown locally. About 90 percent of the acreage has been cropped or has been heavily cut over and burned. Much of this acreage is still used for crops or pasture. The natural vegetation on old, abandoned fields is loblolly pine.

Madison gravelly fine sandy loam, 6 to 10 percent slopes (MhC).—This soil is deep and well drained. A description of a profile, taken in a moist area, follows:

A_{00} 1½ inches to ½ inch, partly decayed leaves, twigs, and pine needles.

A_0 ½ to 0 inch, very dark gray, largely decomposed leaves and organic matter.

A_1 0 to 3 inches, very dark grayish-brown (10YR 3/2) gravelly fine sandy loam; weak, fine, granular structure; very friable; soil mass contains about 20 percent gravel, an occasional cobblestone, and about 10 percent plant roots; strongly acid; gradual, smooth boundary; 2 to 4 inches thick.

A_2 3 to 11 inches, dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; contains about 12 percent gravel and many fine roots; strongly acid; gradual, smooth boundary; 6 to 12 inches thick.

B_1 11 to 19 inches, yellowish-red (5YR 4/8) sandy clay loam; weak, medium, subangular blocky structure; friable to very friable; contains many fine mica flakes; strongly acid; gradual, smooth boundary; 5 to 10 inches thick.

B_2 19 to 34 inches, red (2.5YR 4/8) clay; moderate, medium, subangular blocky structure; friable to firm; contains many fine mica flakes; strongly acid; diffuse, wavy boundary; 12 to 20 inches thick.

B_3 34 to 44 inches, red (2.5YR 4/8) clay loam; moderate, fine and medium, subangular blocky structure; friable; contains enough mica to give it a slick or soapy feel; strongly acid; diffuse, irregular boundary; 8 to 17 inches thick.

C 44 to 48 inches +, soft, highly weathered mica schist.

The B_1 horizon ranges from yellowish red to red. The gravel in the A horizon consists mainly of fragments of quartz and quartz mica schist. In places an occasional thin dike of quartz extends upward from the C horizon into the B_1 horizon. Fragments of weathered mica schist are common in the B_3 horizon, and a few of these fragments are in the B_2 horizon.

This soil contains a moderately large amount of organic matter and a moderately small amount of available plant nutrients. It is strongly acid. Runoff is medium, and permeability and the rate of infiltration are moderate. The moisture-supplying capacity is moderately high.

A few areas of Louisa soils are mapped with this soil. In these areas the B horizon is thin and discontinuous and the profile is commonly shallower than that of the Madison soil.

Madison gravelly fine sandy loam, 6 to 10 percent slopes, is suited to most of the crops grown locally. To protect it from erosion and to maintain good soil tilth, keep it in close-growing crops 2 years out of 3. (Capability unit IIIe–1; woodland group 1.)

Madison gravelly fine sandy loam, 2 to 6 percent slopes, eroded (MhB2).—This soil has a redder or browner plow layer than Madison gravelly fine sandy loam, 6 to 10 percent slopes. The plow layer also contains less organic matter, and the solum is about 8 inches thinner. The degree of erosion varies. In most places the plow layer is within the original A horizon, but in some places nearly half of the plow layer is made up of materials from the B horizon. The soil has a few galled spots, and there are a few shallow gullies.

A few areas of Louisa soils are mapped with this soil. In these areas the B horizon is thin and discontinuous and the solum is generally shallower than that of the Madison soil. A few areas of Cecil soils and about 20 acres of uneroded or only slightly eroded Madison soils are also included. In the Cecil soils the profile is less micaceous than that of the Madison soil and the parent material is porphyritic granite and mica gneiss. In the uneroded or only slightly eroded Madison soils, the A horizon is thicker than in the eroded soil, and it contains a larger amount of organic matter.

Madison gravelly fine sandy loam, 2 to 6 percent slopes, eroded, is suited to most of the crops grown locally. To protect it from erosion, it needs to be kept in close-growing crops 1 year out of 2 or 3. (Capability unit IIe–1; woodland group 1.)

Madison gravelly fine sandy loam, 6 to 10 percent slopes, eroded (MhC2).—This soil has a browner or redder plow layer than Madison gravelly fine sandy loam, 6 to 10 percent slopes, and its solum is 8 to 10 inches thinner. It also contains a smaller amount of organic matter. The degree of erosion varies. In most places the plow layer is within the original A horizon, but in some places nearly half of the plow layer consists of materials from the B horizon. This soil has a few galled spots and shallow gullies, and there are a few U-shaped gullies, 3 to 6 feet deep.

This soil has more rapid runoff, a little slower rate of infiltration, and slightly lower moisture-supplying ca-

pacity than the uneroded or slightly eroded Madison gravelly fine sandy loams.

A few areas of Louisa soils are mapped with this soil. In these areas the B horizon is thin and discontinuous and the solum is generally thinner than that of the Madison soil. A few areas of Cecil soils, which are not mapped separately in this county, and of severely eroded Madison soils are also included. The profile in the Cecil soils is less micaceous than that of the Madison soil, and the parent materials are porphyritic granite and mica gneiss. The plow layer of the severely eroded Madison soils is red sandy clay loam.

Madison gravelly fine sandy loam, 6 to 10 percent slopes, eroded, is suited to most of the crops grown locally. To protect it from erosion, keep the soil in close-growing crops 2 years out of 3. (Capability unit IIIe–1; woodland group 1.)

Madison gravelly fine sandy loam, 10 to 15 percent slopes (MhD).—This soil has a slightly thinner solum than Madison gravelly fine sandy loam, 6 to 10 percent slopes. Because of its stronger slopes, runoff is a little more rapid.

A few areas of Louisa soils are mapped with this soil. In these areas the B horizon is thin and discontinuous and the profile is generally thinner than that of the Madison soil.

Madison gravelly fine sandy loam, 10 to 15 percent slopes, is suited to most of the crops grown locally. To protect it from erosion, it needs to be kept in close-growing crops 3 years out of 4. (Capability unit IVe–1; woodland group 1.)

Madison gravelly fine sandy loam, 10 to 15 percent slopes, eroded (MhD2).—In this soil the solum is about 12 inches thinner than that of Madison gravelly fine sandy loam, 6 to 10 percent slopes. The slopes are also stronger, and runoff is more rapid. The plow layer is browner or redder than that of the uneroded Madison soils. It contains less organic matter, and water infiltrates a little more slowly. The plow layer in this soil is 5 to 8 inches thick.

A few areas of Louisa soils are mapped with this soil. In these areas the B horizon is thin and discontinuous and the profile is generally thinner than that of the Madison soil. A few severely eroded areas of Madison soils are also included. In these areas the red, clayey B horizon is exposed.

Madison gravelly fine sandy loam, 10 to 15 percent slopes, eroded, is suited to most of the crops grown locally. To protect it from erosion, keep it in close-growing crops 3 years out of 4. (Capability unit IVe–1; woodland group 1.)

Madison gravelly fine sandy loam, 15 to 25 percent slopes (MhE).—The solum of this soil is about 12 inches thinner than that of Madison gravelly fine sandy loam, 6 to 10 percent slopes. The soil also has stronger slopes and more rapid runoff. It is low in moisture-supplying capacity and is susceptible to erosion.

Louisa soils make up about 12 percent of this mapping unit. In the areas of Louisa soils, the B horizon is thin and discontinuous and the profile is shallower than that of the Madison soil.

Madison gravelly fine sandy loam, 15 to 25 percent slopes, is not suited to tilled crops. It is suited only to woodland and pasture. (Capability unit VIe–2; woodland group 1.)

Madison gravelly fine sandy loam, 15 to 25 percent slopes, eroded (MhE2).—The solum of this soil is about 14 inches thinner than that of Madison gravelly fine sandy loam, 6 to 10 percent slopes. The plow layer is also browner or redder, contains less organic matter, and is only 5 to 8 inches thick. In most places the plow layer is within the original A horizon, but in some places it includes a small amount of material from the B horizon.

This soil has more rapid runoff, a slower rate of infiltration, and lower moisture-supplying capacity than the uneroded or slightly eroded Madison soils. If not protected, it is likely to become even more eroded.

A few areas of Louisa soils are mapped with this soil. In these areas the B horizon is thin and discontinuous and the solum is generally thinner than that of the Madison soil. A few severely eroded areas of Madison soils are also included. Here, the red, clayey B horizon is exposed.

Madison gravelly fine sandy loam, 15 to 25 percent slopes, eroded, is not suited to tilled crops. It is suited only to perennial vegetation or to loblolly and shortleaf pines. (Capability unit VIe–2; woodland group 1.)

Madison gravelly sandy clay loam, 2 to 6 percent slopes, severely eroded (MiB3).—This soil has a finer texture and milder slopes than Madison gravelly fine sandy loam, 6 to 10 percent slopes. The plow layer is yellowish-red to red gravelly sandy clay loam and is 4 to 6 inches thick. It consists of remnants of the original surface soil, a very dark grayish-brown gravelly fine sandy loam, that have been mixed with soil material from the redder and more clayey B horizon.

The solum of this soil is about 12 inches thinner than that of Madison gravelly fine sandy loam, 6 to 10 percent slopes, and the supply of organic matter is much lower. The rate of infiltration is also slower.

A few areas of Louisa soils are included with this soil. In these areas the soils have a very thin B horizon and a solum that is about 15 to 20 inches thick. A few areas are also included in which the profile is like those of the Cecil soils and the parent materials of the soils are materials from mica gneiss or porphyritic granite. The Cecil soils are not mapped separately in this county.

Madison gravelly sandy clay loam, 2 to 6 percent slopes, severely eroded, is suited to most of the crops grown locally. To protect it from erosion and to improve the tilth, the soil needs to be kept in close-growing crops 2 years out of 3. (Capability unit IIIe–1; woodland group 4.)

Madison gravelly sandy clay loam, 6 to 10 percent slopes, severely eroded (MiC3).—This soil has a finer textured surface layer than Madison gravelly fine sandy loam, 6 to 10 percent slopes, and its solum is about 14 inches thinner. The plow layer is yellowish-red to red gravelly sandy clay loam, 4 to 6 inches thick. It is made up partly of remnants of the original surface soil, a very dark grayish-brown gravelly fine sandy loam, but

consists mainly of redder and more clayey soil materials from the B horizon. The soil has many galled spots and shallow gullies. There are a few U-shaped gullies, 4 to 6 feet deep.

This soil has more rapid runoff, a slower rate of infiltration, and lower moisture-supplying capacity than the uneroded or slightly eroded Madison soils. The supply of organic matter is much lower, and the soil has much poorer tilth.

A few areas of Louisa soils are mapped with this soil. In these areas the B horizon is thin and discontinuous and the solum is generally thinner than that of the Madison soil. A few areas of Cecil soils, which are not mapped separately in this county, are also included. Here, the profile contains less friable and less micaceous soil material than that of the Madison soil and the parent materials are porphyritic granite and mica gneiss.

Because of the severe erosion and the low moisture-supplying capacity of Madison gravelly sandy clay loam, 6 to 10 percent slopes, severely eroded, this soil is best kept in perennial vegetation. Most of the local crops can be grown, however, if the soil is kept in close-growing crops 3 years out of 4. (Capability unit IVe-1; woodland group 4.)

Madison gravelly sandy clay loam, 6 to 10 percent slopes, very severely eroded (MiC4).—This soil has a finer textured surface layer than Madison gravelly fine sandy loam, 6 to 10 percent slopes, and its profile is about 20 inches thinner. The plow layer is red sandy clay loam made up mainly of materials from the lower part of the B horizon. The soil has many galled spots and shallow gullies, and there are a few U-shaped gullies, 4 to 8 feet deep.

This soil has more rapid runoff, a slower rate of infiltration, and lower moisture-supplying capacity than the uneroded or slightly eroded Madison soils. The supply of organic matter is also much lower, and the soil has much poorer tilth.

Because of the severe hazard of erosion, poor tilth, and low moisture-supplying capacity, this soil should be kept in perennial vegetation or trees. It is suited to shortleaf and loblolly pines. (Capability unit VIe-2; woodland group 8.)

Madison gravelly sandy clay loam, 10 to 15 percent slopes, severely eroded (MiD3).—The solum of this soil is about 16 inches thinner than that of Madison gravelly fine sandy loam, 6 to 10 percent slopes. The plow layer is red gravelly sandy clay loam, 4 to 6 inches thick. It is made up of remnants of the original sandy loam surface soil mixed with the redder and more clayey soil materials from the B horizon. It consists mainly of materials from the B horizon. The soil has many galled spots and shallow gullies, and there are a few U-shaped gullies, 4 to 6 feet deep.

This soil has more rapid runoff, a slower rate of infiltration, and lower moisture-supplying capacity than the uneroded or slightly eroded Madison soils. It also contains much less organic matter and has much poorer tilth.

A few areas of Louisa soils are mapped with this soil. In these areas the B horizon is thin and discontinuous and the solum is generally thinner than that of the Madison soil. A few areas of Cecil soils, which are not mapped separately in this county, are also included. Here, the profile is less friable and less micaceous than that of the Madison soil and the parent materials are porphyritic granite and mica gneiss.

Madison gravelly sandy clay loam, 10 to 15 percent slopes, severely eroded, is not suited to cultivated crops. It is best suited to perennial vegetation and trees. (Capability unit VIe-2; woodland group 6.)

Madison gravelly sandy clay loam, 10 to 15 percent slopes, very severely eroded (MiD4).—This soil has a solum that is about 20 inches thinner than that of Madison gravelly fine sandy loam, 6 to 10 percent slopes, and erosion has been much more severe. The surface layer is red sandy clay loam composed mainly of materials from the B_2 and B_3 horizons. The soil has many galled spots and shallow gullies (fig. 5). There are a few U-shaped gullies, 4 to 8 feet deep.

***Figure 5.*—Area of Madison gravelly sandy clay loam, 10 to 15 percent slopes, very severely eroded. Careful management is required to establish any kind of vegetation on this soil.**

This soil has more rapid runoff, a slower rate of infiltration, lower moisture-supplying capacity, and a smaller supply of organic matter than the uneroded or slightly eroded Madison soils. It also has much poorer tilth.

A few areas of severely eroded Louisa soils are mapped with this soil. In these areas the B horizon is thin and discontinuous and the solum is thinner than in the Madison soil.

Madison gravelly sandy clay loam, 10 to 15 percent slopes, very severely eroded, is suited only to pine trees. (Capability unit VIIe-1; woodland group 8.)

Madison gravelly sandy clay loam, 15 to 25 percent slopes, severely eroded (MiE3).—This soil has stronger slopes and a finer textured plow layer than Madison gravelly fine sandy loam, 6 to 10 percent slopes, and its solum is about 18 inches thinner. The plow layer is red gravelly sandy clay loam, 4 to 6 inches thick. It consists of remnants of the original sandy loam surface soil mixed with materials from the redder and more clayey B horizon. The plow layer is composed mainly of materials from the B horizon. The soil has many

galled spots and shallow gullies. There are a few U-shaped gullies, 4 to 6 feet deep.

This soil has more rapid runoff, a slower rate of infiltration, and lower moisture-supplying capacity than the uneroded or slightly eroded Madison soils. The supply of organic matter is also much lower, and the soil has much poorer tilth.

A few areas of Louisa soils are mapped with this soil. In these areas the B horizon is thin and discontinuous and the solum is thinner than that of the Madison soil. A few areas of Cecil soils, which are not mapped separately in this county, are also included. Here, the profile is less friable and less micaceous than that of the Madison soil, and the parent materials are porphyritic granite and mica gneiss.

Madison gravelly sandy clay loam, 15 to 25 percent slopes, severely eroded, is suited only to loblolly and shortleaf pines. (Capability unit VIIe-1; woodland group 6.)

Madison gravelly sandy clay loam, 15 to 25 percent slopes, very severely eroded (MiE4).—This soil has stronger slopes and is finer textured than Madison gravelly fine sandy loam, 6 to 10 percent slopes, and its solum is about 22 inches thinner. The surface layer is red sandy clay loam, 4 to 5 inches thick, made up mainly of materials from the lower part of the B horizon. The soil has many galled spots and shallow gullies. There are a few U-shaped gullies, 4 to 8 feet deep.

This soil has more rapid runoff and a slower rate of infiltration than the uneroded or slightly eroded Madison soils. The moisture-supplying capacity is also lower, the soil contains much less organic matter, and tilth is much poorer.

This soil is suited only to shortleaf and loblolly pines. (Capability unit VIIe-1; woodland group 8.)

Mecklenburg Series

The Mecklenburg series consists of moderately deep to deep, moderately well drained to well drained, acid soils. The surface layer is brown sandy loam, and the subsoil is yellowish-red clay. The soils have formed in materials weathered from diorite, hornblende gneiss, mica schist, and other basic igneous and metamorphic rocks. They are on smooth slopes and on low divides. The original vegetation was oak, gum, hickory, pine, and poplar.

The Mecklenburg soils occur with Lloyd, Davidson, Musella, Madison, Helena, and Wilkes soils. They are lighter colored and firmer than the Lloyd, Davidson, or Madison soils; are redder than the Helena soils; and are deeper and have a thicker B horizon than the Musella or Wilkes soils.

The Mecklenburg soils have good tilth, but they are low in organic matter and in available plant nutrients. Crops grown on them respond well to fertilizer and make moderate yields.

Only one soil of the Mecklenburg series—Mecklenburg sandy loam, 6 to 10 percent slopes, eroded—occurs in this county. It is in small areas in the northwestern part. Most areas of this soil have been cultivated, but more than half of the acreage is in second-growth pines. The rest is used for oats, cotton, and pasture.

Mecklenburg sandy loam, 6 to 10 percent slopes, eroded (MqC2).—This soil is deep and is moderately well drained. It occurs in small areas in the northwestern part of the county. A description of a profile, taken in a moist area, follows:

A_p 0 to 6 inches, brown (10YR 5/3) sandy loam; weak, medium, granular structure; very friable; many fine plant roots and a few small pebbles; medium acid; clear, smooth boundary; 4 to 9 inches thick.

A_3 6 to 10 inches, brown (10YR 5/3) loam; moderate, medium, granular structure; friable; many fine roots; medium acid; clear, wavy boundary; 2 to 5 inches thick.

B_{21} 10 to 28 inches, yellowish-red (5YR 4/6) clay; strong, medium, subangular blocky structure; very firm or plastic; strongly acid; gradual, wavy boundary; 10 to 20 inches thick.

B_{22} 28 to 37 inches, yellowish-red (5YR 4/6) clay with common, medium, faint mottles of reddish yellow and brown; strong, medium, subangular blocky structure; very firm or plastic; strongly acid; diffuse, wavy boundary; 6 to 12 inches thick.

C 37 to 52 inches +, soft, weathered diorite, mica schist, and gneiss.

The plow layer ranges in color from light grayish brown to reddish yellow. In a few areas the soil is gravelly. The B horizon ranges in color from yellowish red to reddish brown. In some places there is a thin, sandy clay loam B_1 horizon instead of an A_3 horizon.

Runoff is medium, and the rate of infiltration is moderately rapid. Permeability is moderately slow, and the moisture-supplying capacity is medium.

A few areas of Lloyd soils are mapped with this soil. In these areas the B horizon is darker and more friable than in the Mecklenburg soil. Some areas in which slopes are 2 to 6 percent are also included with the Mecklenburg soil.

Mecklenburg sandy loam, 6 to 10 percent slopes, eroded, is moderately well suited to most crops grown locally. To protect it from erosion and to maintain good soil tilth, keep it in close-growing crops 2 years out of 3. (Capability unit IIIe-3; woodland group 4.)

Molena Series

The Molena series consists of deep, somewhat excessively drained, strongly acid soils that have a texture of loamy sand throughout the profile. The soils have formed in old alluvium on gently rolling high terraces. The original vegetation was oak and pine.

The Molena soils occur with Wickham, Appling, and Madison soils. They contain much more sand than any of the associated soils.

The Molena soils are low in organic matter and in available plant nutrients. Crops grown on them respond well to fertilizer, but yields are generally low to moderate. The soils are droughty, and plant nutrients soon leach out.

These soils occur in small areas near the larger streams in the county They are well suited to Coastal bermudagrass and are moderately well suited to a limited number of other crops. Most of the areas are used for corn, grain sorghum, or pasture.

Molena loamy sand, 2 to 6 percent slopes (MtB).—This soil is deep but is somewhat excessively drained. It occurs in small areas near the larger streams in the

county. A description of a profile, taken in a moist area, follows:

A_p 0 to 6 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, medium, granular structure; loose or very friable; many fine roots; strongly acid; clear, smooth boundary 4 to 10 inches thick.

C_1 6 to 20 inches, dark-brown (7.5YR 4/4) loamy sand; weak, medium, granular structure; very friable; many fine roots; strongly acid; diffuse, wavy boundary; 12 to 30 inches thick.

C_2 20 to 44 inches +, strong-brown (7.5YR 5/6) loamy sand to sandy loam; weak, medium, granular structure; very friable; many fine mica flakes; strongly acid.

The plow layer ranges in color from yellowish brown to dark grayish brown or dark reddish brown. The soil generally becomes finer textured at increasing depths. In places sandy clay loam is at a depth of about 30 inches. A few water-rounded pebbles are on the surface or throughout the profile.

This soil has slow to medium runoff and rapid infiltration and permeability. The moisture-supplying capacity is low. Fertilizer that has been added often leaches out of the soil; consequently, fertilizer should be added in split applications.

This soil is moderately well suited to most of the crops grown locally, but the low moisture-supplying capacity limits yields. To maintain good tilth and to increase the moisture-supplying capacity, the soil needs to be kept in close-growing crops 1 year out of 2 or 3. (Capability units IIs-1; woodland group 4.)

Molena loamy sand, 6 to 10 percent slopes (MtC).—This soil has stronger slopes and more rapid runoff than Molena loamy sand, 2 to 6 percent slopes. A few small areas in which slopes are 10 to 15 percent have been mapped with it.

Molena loamy sand, 6 to 10 percent slopes, is moderately well suited to most crops grown locally, but the low moisture-supplying capacity limits yields. To maintain good soil tilth and to increase the moisture-supplying capacity, keep the soil in close-growing crops 2 years out of 3. (Capability unit IIIe-2; woodland group 4.)

Musella Series

The Musella series consists of shallow, well-drained to somewhat excessively drained, strongly acid soils that have a thin and discontinuous B horizon. The soils have formed in materials weathered primarily from basic igneous and metamorphic rocks and, to a lesser extent, from acid igneous and metamorphic rocks. Slopes range from 6 to 25 percent. The original vegetation was oak, hickory, pine, and poplar.

The Musella soils occur with Davidson, Lloyd, Madison, Wilkes, and Louisburg soils. They are shallower and have a thinner B horizon than the Davidson, Lloyd, or Madison soils. They are much redder than either the Wilkes or Louisburg soils, and they formed from a different kind of parent material. The Wilkes soils formed from a mixture of materials from acidic and basic rocks, and the Louisburg soils, from acidic rocks.

The supply of organic matter is low in these soils, and the soils are low in available plant nutrients. Crops respond well to fertilizer, and yields are commonly low to moderate.

The Musella soils are on somewhat broken interstream divides and on smooth to broken slopes in the northwestern part of Douglas County. Erosion, strong slopes, and stoniness limit the crops that can be grown on Musella soils. More than half of the acreage of these soils in the county has been cultivated, but much of it is now in pine trees. Several acres are used for cotton, corn, small grains, and pasture.

Musella stony fine sandy loam, 15 to 25 percent slopes (MFE).—This soil is shallow and is somewhat excessively drained. It has many small to large basic rocks on the surface. The B horizon is thin and discontinuous. A description of a profile, taken in a moist area, follows:

A_1 0 to 1 inch, very dark grayish-brown (10YR 3/2) stony fine sandy loam; weak, fine, granular structure; very friable; medium acid; clear, smooth boundary; 1 to 2 inches thick.

A_3 1 to 4 inches, reddish-brown (2.5YR 4/4) stony fine sandy loam; weak, fine and medium, granular structure; very friable; 8 to 10 percent basic gravel; medium to strongly acid; gradual, wavy boundary; 2 to 6 inches thick.

B_1 4 to 8 inches, dark-red (2.5YR 3/6) fine sandy loam; weak, fine and medium, granular structure; friable; strongly acid; gradual, wavy boundary; 2 to 6 inches thick.

B_2 8 to 18 inches, dark-red (10R 3/6) sandy clay loam or clay; moderate, medium, subangular blocky structure; firm to very firm; small and large fragments of basic rocks scattered throughout; gradual, irregular boundary; 4 to 12 inches thick.

C 18 to 40 inches, yellowish-red sandy clay loam to sandy loam consisting of highly weathered material from diorite; many, coarse, distinct mottles of yellowish brown and black; massive to weak, fine, subangular blocky structure; very friable; many slightly weathered fragments of rock scattered throughout; gradual, irregular boundary; 0 to 30 inches thick.

D_r 40 inches +, slightly weathered basic rocks consisting primarily of diorite and hornblende gneiss.

The A horizon is brown to strong brown. Where the soil has formed partly from acid rocks, the B horizon is generally yellowish red. In many places the B horizon directly overlies the D_r horizon.

Because of the stones this soil is hard to work. Runoff is rapid, and permeability and the rate of infiltration are moderate. The soil is low in moisture-supplying capacity.

This soil is best suited to trees or perennial vegetation. (Capability unit VIe-1; woodland group 6.)

Musella clay loam, 6 to 10 percent slopes, eroded (MvC2).—This soil has a finer textured surface layer, milder slopes and fewer stones than Musella stony fine sandy loam, 15 to 25 percent slopes. The plow layer is commonly dark reddish-brown clay loam, 5 to 8 inches thick, and is generally a mixture of materials from the original A horizon and the finer textured B horizon. The soil has many galled spots and a few gullies.

A few areas of Lloyd and Davidson soils are mapped with this soil. In these areas the soil is deep and the B horizon is thick. A few areas that have a surface layer of sandy clay loam or sandy loam are also included. There are a few stony and gravelly areas.

Runoff is rapid on Musella clay loam, 6 to 10 percent slopes, eroded. Permeability is moderate, and the rate of infiltration is moderately slow. The soil is low in moisture-supplying capacity, in available plant nutrients, and in organic matter. Tilth is fair. Crops on this soil

make fair response to fertilizer, but yields are commonly low to moderate.

This soil is best suited to perennial vegetation. It can be cropped 1 year out of 4, however, if it is kept in close-growing crops the rest of the time. (Capability unit IVe-2; woodland group 6.)

Musella clay loam, 10 to 15 percent slopes, eroded (MvD2).—This soil has a finer textured surface layer, slightly milder slopes, and fewer stones than Musella stony fine sandy loam, 15 to 25 percent slopes. In most places the surface layer is dark reddish-brown clay loam that is 5 to 7 inches thick. It consists mainly of materials from the B horizon. The soil has many galled spots and shallow gullies, and there are a few V-shaped gullies that are 2 to 3 feet deep.

A few areas of Lloyd and Davidson soils are mapped with this soil. In these areas the soil is deep and the B horizon is thick. There are a few stony and gravelly areas.

The supply of organic matter is low in Musella clay loam, 10 to 15 percent slopes, eroded, and the soil is low in available plant nutrients. Tilth is fair. Crops make fair response to fertilizer, but yields are usually low. Runoff is rapid, and the moisture-supplying capacity of this soil is low. Permeability is moderate, and the rate of infiltration is slow.

This soil is suited only to perennial vegetation. (Capability unit VIe-4; woodland group 6.)

Musella clay loam, 15 to 25 percent slopes, eroded (MvE2).—This soil has a finer textured surface layer and is shallower than Musella stony fine sandy loam, 15 to 25 percent slopes. It also has more rapid runoff, fewer stones, and a slower rate of infiltration than the uneroded Musella soils. In most places the surface layer is made up of materials from the B horizon. It consists of dark reddish-brown clay loam that is about 5 inches thick. The soil has many galled spots and shallow gullies. There are a few V-shaped gullies, 2 to 3 feet deep.

A few areas of Wilkes soils are mapped with this soil. In these areas the soil has formed from mixed acidic and basic rocks. A few areas of Lloyd and Davidson soils are also included. Here, the soil is deep and the B horizon is thick. There are a few stony, cobbly, and gravelly areas.

Musella clay loam, 15 to 25 percent slopes, eroded, is low in organic matter, in available plant nutrients, and in moisture-supplying capacity. Permeability is moderate, and the rate of infiltration is slow. Runoff is very rapid. The soil has fair to poor tilth, and yields are usually low.

This soil is best suited to trees or to perennial vegetation. (Capability unit VIIe-2; woodland group 6.)

Musella stony clay loam, 6 to 10 percent slopes, eroded (MwC2).—This soil has a finer textured surface layer, milder slopes, and a slower rate of infiltration than Musella stony fine sandy loam, 15 to 25 percent slopes. The surface layer is commonly dark reddish-brown clay loam, 5 to 8 inches thick. The soil has many galled spots and shallow gullies, and there are a few V-shaped gullies, 2 to 3 feet deep. The surface layer is made up mainly of materials from the B horizon.

A few areas of Wilkes soils are mapped with this soil. In these areas the parent material of the soil is mixed acidic and basic rocks. A few areas of Davidson soils are also included. Here, the soil is deep and the B horizon is thick.

Musella stony clay loam, 6 to 10 percent slopes, eroded, is low in organic matter and in available plant nutrients. Runoff is very rapid. Permeability is moderate, and the rate of infiltration is slow. The soil has poor tilth. The moisture-supplying capacity is low, and yields are usually low.

Because of stoniness and severe erosion, this soil is best suited to perennial vegetation. (Capability unit VIe-1; woodland group 6.)

Musella stony clay loam, 10 to 15 percent slopes, eroded (MwD2).—This soil is shallower and has slightly milder slopes than Musella stony fine sandy loam, 15 to 25 percent slopes. It also has a finer textured surface layer than the uneroded Musella soils, more rapid runoff, and a slower rate of infiltration. In most places the surface layer is made up of dark reddish-brown clay loam, 5 to 6 inches thick. It is composed mainly of materials from the B horizon. The soil has many galled spots and shallow gullies. There are a few V-shaped gullies 2 to 3 feet deep.

A few areas of Wilkes soils are mapped with this soil. In these areas the soil has formed from mixed acidic and basic rocks. A few areas of Davidson soils are also included. Here, the soil is deep and the B horizon is thick.

Musella stony clay loam, 10 to 15 percent slopes, eroded, is low in organic matter and in available plant nutrients. The soil has poor tilth, and yields are usually low. Runoff is very rapid, and the soil is low in moisture-supplying capacity. Permeability is moderate, and the rate of infiltration is slow.

This soil is best suited to trees or pasture. (Capability unit VIIe-2; woodland group 6.)

Musella stony clay loam, 15 to 25 percent slopes, eroded (MwE2).—This soil has a finer textured surface layer and is shallower than Musella stony fine sandy loam, 15 to 25 percent slopes. It also has more rapid runoff and a slower rate of infiltration. In many places the surface layer is made up of dark reddish-brown clay loam that is about 5 inches thick. It is composed mainly of materials from the B horizon. The soil has many galled spots, shallow gullies, and V-shaped gullies that are 2 or 3 feet deep.

A few areas of Wilkes soils are mapped with this soil. In these areas the soil has formed from mixed acidic and basic rocks. There are a few rock outcrops.

Musella stony clay loam, 15 to 25 percent slopes, eroded, is low in organic matter and in available plant nutrients. The soil has poor tilth and yields are usually low. Runoff is very rapid. Permeability is moderate, and the rate of infiltration is slow. The soil has low moisture-supplying capacity.

The soil is best suited to trees or pasture. (Capability unit VIIe-2; woodland group 6.)

Rock Outcrop

Rock outcrop (RoK).—About half of this miscellaneous land type consists of areas in which the granitic bedrock outcrops or is within a few inches of the surface. In the rest of the acreage, the bedrock is covered by as much as 15 to 18 inches of soil material that shows varying degrees of horizon development. This land type occurs in small areas throughout the county. It has slopes that range from 6 to 40 percent.

Generally, plants in areas of Rock outcrop cannot make continuous growth. A few trees, shrubs, and grasses, however, have survived for years in small pockets of soil or in the crevices in the rocks. This land type can be developed to a limited extent for recreational use and to provide food and cover for wildlife. (Capability unit VIIIs–1.)

State Series

The State series consists of deep, well-drained, strongly acid, brown, loamy soils that have formed in old alluvium. The soils are on low stream terraces. They have slopes of 0 to 6 percent. The original vegetation was poplar, maple, ash, gum, oak, hickory, and pine.

These soils occur with Congaree, Chewacla, Buncombe, Altavista, and Wickham soils. They occur at higher elevations and have more distinct horizon development than the Congaree, Buncombe, and Chewacla soils. They have a less mottled subsoil than the Altavista soils and are less reddish and have less distinct horizon development than the Wickham soils.

The State soils have a low to medium supply of organic matter and are low to medium in available plant nutrients. Crops grown on them respond well to fertilizer and make high yields. The soils generally are suited to sprinkler irrigation.

Only one soil of the State series—State fine sandy loam, 0 to 6 percent slopes—occurs in this county. It is in small areas along the major streams. Most areas of this soil are used for corn, small grains, or pasture.

State fine sandy loam, 0 to 6 percent slopes (Sta).—This brown loamy soil occurs in small areas along the major streams in the county. It is deep and well drained. A description of a profile, taken in a moist area, follows:

A_p 0 to 8 inches, dark yellowish-brown (10YR 3/4) to brown (10YR 5/3, dry) fine sandy loam; weak, fine and medium, granular structure; very friable; many fine mica flakes; strongly acid; gradual, smooth boundary; 5 to 10 inches thick.

B_1 8 to 15 inches, dark yellowish-brown (10YR 3/4) silt loam or very fine sandy loam; moderate, fine and medium, subangular blocky structure; friable; many fine mica flakes and sharp quartz sand grains; very strongly acid; clear, smooth boundary; 4 to 12 inches thick.

B_2 15 to 31 inches, strong-brown (7.5YR 5/6) fine sandy clay loam; moderate, medium, subangular blocky structure; friable; many fine mica flakes and a few concretions and partly decayed roots; very strongly acid; gradual, smooth boundary; 10 to 20 inches thick.

B_3 31 to 45 inches +, strong-brown (7.5YR 5/6) sandy clay loam; weak, fine, granular and subangular blocky structure; friable; many fine mica flakes, partly decayed roots, and pores; strongly acid.

Distinction between horizons is very faint in some profiles. In places the lower part of the B_2 horizon contains a few faint mottles of pale brown or grayish brown. The texture of the B horizon ranges from heavy sandy loam to sandy clay loam or silty clay loam. In places there is a D horizon of layered sand, gravel, or silty clay.

Runoff is slow to medium, and permeability and the rate of infiltration are moderately rapid. The soil is moderately high in moisture-supplying capacity. Tilth is good. This soil generally is well suited to sprinkler irrigation, and has an adequate supply of water nearby.

A few areas of Altavista soils are mapped with this soil. In these areas the subsoil is mottled.

State fine sandy loam, 0 to 6 percent slopes, is suited to most of the crops grown locally. To protect the stronger slopes from erosion and to maintain good tilth, the soil needs to be kept in close-growing crops 1 year out of 2 or 3. (Capability unit IIe–2; woodland group 2.)

Wehadkee Series

The Wehadkee series consists of deep, poorly drained, very strongly acid soils that have a texture of silty clay loam throughout the profile. The soils are on nearly level flood plains and have slopes ranging from 0 to 2 percent. They have formed in recent alluvium washed from Madison, Louisa, Appling, Lloyd, and Davidson soils. The original vegetation was willow, elm, ash, gum, beech, alder, water oak, and poplar.

These soils occur with Chewacla and Congaree soils. They are grayer and are mottled much closer to the surface than the Chewacla and Congaree soils, and they have a higher water table. In most places they are also finer textured.

The Wehadkee soils are high in organic matter and are low in available plant nutrients. Crops grown on them give fair response to fertilizer. In general, soil tilth is good, but in many places it is poor because the soils are wet. If a system is installed to provide intensive drainage, pastures usually make low to moderate yields.

Only one soil of the Wehadkee series—Wehadkee silty clay loam—occurs in this county, and this soil is along the larger streams. A very small proportion of this soil has been cleared, and the cleared areas are used mostly for pasture. The soil is suited to only a limited number of crops.

Wehadkee silty clay loam (0 to 2 percent slopes) (Weh).—This deep, mottled, poorly drained soil is very strongly acid. It has a texture of silty clay loam throughout the profile. A description of a profile, taken in a moist area, follows:

A 0 to 9 inches, gray (10YR 5/1) silty clay loam with many, medium, distinct mottles of dark grayish brown and light yellowish brown; massive; slightly plastic and sticky; contains about 10 percent partly decayed plant residues; very strongly acid; gradual, smooth boundary; 7 to 12 inches thick.

C_1 9 to 36 inches, light-gray (10YR 6/1) silty clay loam, silt loam, or silty clay with many, coarse, distinct and prominent mottles of white, light yellowish brown, and yellow; massive; slightly sticky and plastic; contains small amount of partly decayed plant residues; very strongly acid; 20 to 40 inches thick.

C_2 36 inches +, layers of gray sand, sandy loams, and silty clay loams; very strongly acid.

The surface layer ranges in color from dark gray to dark grayish brown. The amount of organic matter

varies. Layers of sand or sandy loam are common throughout the profile.

Runoff is very slow, and permeability and the rate of infiltration are slow. The soil is high in moisture-supplying capacity.

This soil is suited to fescue, dallisgrass, whiteclover, and annual lespedeza. It is also suited to smartweed and other plants that can be used as food and cover for wildlife. (Capability unit IVw-1.)

Wickham Series

The Wickham series consists of deep, well-drained, strongly acid soils that have a surface layer of light-brown sandy loam and a subsoil of red clay. The soils have formed in old alluvium. They are on high, gently rolling terraces that have slopes of 2 to 10 percent. The original vegetation was oak, hickory, pine, poplar, and gum.

These soils occur with Altavista and Madison soils. They are redder than the Altavista soils and contain less mica than the Madison soils. In addition, the Madison soils formed in materials weathered from mica schist rather than in old alluvium.

The Wickham soils are low in organic matter and in available plant nutrients. Crops respond well to fertilizer, and yields are usually moderate to high. In areas that are not severely eroded, the soils are generally well suited to sprinkler irrigation and there is an adequate supply of water nearby for irrigation.

In this county the Wickham soils occur along the major streams. They are suited to most of the crops grown locally. Most of the areas have been cultivated. About 60 percent of the acreage is pastured, 20 percent is cropped, and 20 percent is woodland.

Wickham fine sandy loam, 2 to 6 percent slopes, eroded (WgB2).—This deep, well-drained soil is strongly acid. A description of a profile, taken in a moist area, follows:

A_p 0 to 7 inches, light yellowish-brown (10YR 6/4) to very pale brown (10YR 7/4, dry) fine sandy loam; weak, medium, granular structure; very friable; 8 to 10 percent of soil mass is rounded gravel; strongly acid; clear, smooth boundary; 5 to 10 inches thick.

B_{21} 7 to 25 inches, red (2.5YR 4/8) sandy clay; strong, fine and medium, subangular blocky structure; firm when moist, very hard when dry; strongly acid; diffuse, wavy boundary; 10 to 20 inches thick.

B_{22} 25 to 52 inches, red (2.5YR 4/8) to dark-red (2.5YR 3/6) sandy clay; strong, fine and medium, subangular blocky structure; firm when moist, very hard when dry; strongly acid; clear, wavy boundary; 12 to 30 inches thick.

D 52 inches +, weakly cemented layer of water-rounded pebbles.

The plow layer ranges in color from very pale brown to reddish brown. In some areas there is a B_1 horizon of sandy clay loam about 4 inches thick. In other areas there is a B_2 horizon of fine sandy clay. A few mica flakes occur throughout the profile, and a few small areas have a small number of pebbles throughout the profile. The pebbles have been rounded by water. In some places the B horizon rests on an old, buried soil profile instead of on a layer of water-rounded pebbles. The degree of erosion varies, but in most places the plow layer is barely within the A horizon.

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Runoff is slow to medium, and permeability and the rate of infiltration are moderate. The soil is moderately high in moisture-supplying capacity.

A few areas of Madison soils are mapped with this soil. In these areas the soil is highly micaceous throughout.

Wickham fine sandy loam, 2 to 6 percent slopes, eroded, is well suited to sprinkler irrigation, and there is an adequate supply of water nearby. The soil is suited to most of the crops grown locally (fig. 6). To protect it from

Figure 6.—**Corn on Wickham fine sandy loam, 2 to 6 percent slopes, eroded. The younger corn on the left is on Altavista fine sandy loam, 2 to 6 percent slopes, eroded. In the background is a light-colored area of Chewacla soils.**

erosion and to maintain good tilth, keep the soil in close-growing crops 1 year out of 2 or 3. (Capability unit IIe-1; woodland group 1.)

Wickham fine sandy loam, 6 to 10 percent slopes, eroded (WgC2).—Because of its stronger slopes, this soil has more rapid runoff and is slightly more eroded than Wickham fine sandy loam, 2 to 6 percent slopes, eroded. In many places the plow layer is reddish brown. The plow layer is 5 or 6 inches thick, and in most places it contains a little material from the B horizon (fig. 7). The soil has a few galled spots and shallow gullies.

A few areas of Madison soils are mapped with this soil. In these areas the soil is highly micaceous throughout.

Wickham fine sandy loam, 6 to 10 percent slopes, eroded, is suited to most crops grown locally. To protect it from erosion and to maintain good tilth, keep this soil in close-growing crops 2 years out of 3. (Capability unit IIIe-1; woodland group 1.)

Wickham clay loam, 2 to 6 percent slopes, severely eroded (WhB3).—This soil has a redder and finer textured surface layer than Wickham fine sandy loam, 2 to 6 percent slopes, eroded. It also has slightly more rapid runoff and a slower rate of infiltration. The degree of erosion varies, but in most places more than half of the plow layer is made up of materials from the B horizon. The soil has a few galled spots and shallow gullies.

This soil is suited to most of the crops grown locally. To protect it from erosion and to improve tilth, keep this soil in close-growing crops 2 years out of 3. (Capability unit IIIe-1; woodland group 4.)

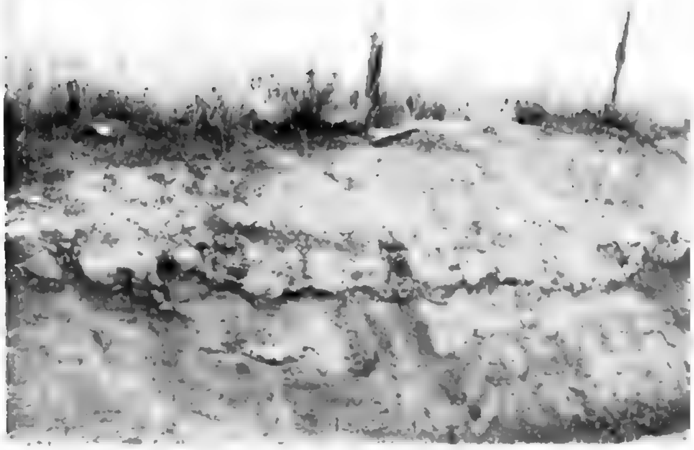

Figure 7.—**Profile of Wickham fine sandy loam, 6 to 10 percent slopes, eroded, in a pasture of sericea lespedeza. This soil has a clayey subsoil that is about 2 feet thick. The subsoil overlies a layer of water-rounded pebbles that rests on weathered bedrock.**

Wickham clay loam, 6 to 10 percent slopes, severely eroded (WnC3).—This soil has stronger slopes and a redder, finer textured surface layer than Wickham fine sandy loam, 2 to 6 percent slopes, eroded. It also has more rapid runoff and a slower rate of infiltration. The degree of erosion varies, but in most places more than half of the plow layer is made up of materials from the B horizon. In some places practically all of the plow layer consists of materials from the B horizon. The soil has many galled spots and shallow gullies. There are a few U-shaped gullies, 2 to 5 feet deep.

This soil is better suited to perennial vegetation than to cultivated crops. If kept in close-growing crops 3 years out of 4, however, it is suited to most of the crops grown locally. (Capability unit IVe–1; woodland group 4.)

Wilkes Series

The soils of the Wilkes series are shallow, well drained to somewhat excessively drained, and strongly acid. They have a variable profile, but the texture of their surface layer is sandy loam. The soils have developed in materials weathered from mixed acidic and basic igneous and metamorphic rocks. They have slopes of 6 to 15 percent. Some of the slopes are smooth and rolling, and others are broken. The original vegetation was oak, hickory, and pine.

The Wilkes soils occur with Musella, Mecklenburg, Davidson, and Louisburg soils. They are not so red as the Musella, Davidson, and Mecklenburg soils. They have formed from mixed acidic and basic rocks, in contrast to the Louisburg soils, which have formed from acidic rocks.

The Wilkes soils are low in organic matter and in available plant nutrients. Crop yields are usually low to moderate.

These soils are in small areas in the northwestern and north-central parts of this county. Most areas that are not stony have been cultivated but are now in trees. The soils are moderately well suited to a limited number of crops grown locally.

Wilkes sandy loam, 6 to 10 percent slopes, eroded (WiC2).—This shallow, well-drained soil has a thin, variable subsoil. A description of a profile, taken from a moist site, follows:

A_p 0 to 6 inches, pale-brown (10YR 6/3) sandy loam; weak, fine, granular structure; very friable; about 10 percent of soil mass is hornblende and quartz gravel; strongly acid; clear, smooth boundary; 4 to 7 inches thick.

B 6 to 14 inches, yellowish-brown (10YR 5/4) clay with common, fine, faint mottles of strong brown (7.5YR 5/8); strong, coarse, blocky structure; very firm, very hard or extremely plastic; prominent clay films on surfaces of peds; strongly acid; gradual, wavy boundary; 5 to 16 inches thick.

C 14 to 24 inches +, silty clay, highly mottled with yellow, brown, gray, and black, and materials from highly weathered mixed schist, hornblende, and gneiss.

The color of the surface layer ranges from brown to light brownish gray. The B horizon ranges in texture from a light sandy clay loam to heavy clay. Outcrops of stones and rock are common.

The soil generally has good tilth. Crops grown on it respond well to fertilizer, but the effects of the fertilizer do not last long.

A few areas of Iredell soils, which are not mapped separately in this county, are included with this soil. In these areas the B horizon is clay that is extremely fine textured. A few areas in which slopes are between 2 and 6 percent are also included.

Wilkes sandy loam, 6 to 10 percent slopes, eroded, is moderately well suited to a limited number of crops. It should be kept in close-growing crops 3 years out of 4. (Capability unit IVe–4; woodland group 7.)

Wilkes stony sandy loam, 10 to 15 percent slopes, eroded (WjD2).—This soil has a thinner solum than Wilkes sandy loam, 6 to 10 percent slopes, eroded. It also has more rapid runoff and a slower rate of infiltration. The degree of erosion varies. The soil has many galled spots, shallow gullies, and a few V-shaped gullies 2 to 5 feet deep. There are many rock outcrops. The soil is somewhat excessively drained.

A few areas of Musella soils have been mapped with this soil. In these areas the solum is red. A few areas that have slopes of 6 to 10 percent, or of 15 to 40 percent, have also been included.

The strong slopes and the stoniness of Wilkes stony sandy loam, 10 to 15 percent slopes, eroded, make it suitable only for trees. (Capability unit VIIe–2; woodland group 7.)

How to Use and Manage the Soils

This section has six main parts. In the first, the system of capability classification used by the Soil Conservation Service is explained and the capability units of Douglas County are briefly defined. In the second, the capability units are fully described, the soils of each unit are listed, and the suitability and the management requirements for growing cultivated crops and pasture are

discussed. In the third, estimated yields for each soil are given for commonly grown crops under two levels of management. In the fourth, the suitability and limitations of the soils for wood products are discussed by woodland suitability groups. In the fifth, the relation of wildlife to soils is discussed very briefly. Finally, in the sixth, certain soil qualities that affect engineering uses are discussed.

Capability Groups of Soils

The capability classification is a grouping that shows, in a general way, how suitable soils are for most kinds of farming. It is a practical grouping based on limitations of the soils, on the risk of damage when they are used, and on the way they respond to treatment.

In this system all the kinds of soil are grouped at three levels—the capability class, subclass, and unit. The eight capability classes, the broadest grouping, are designated by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the remaining classes have progressively greater natural limitations. In class VIII are soils and land types so rough, shallow, or otherwise limited that they do not produce worthwhile yields of crops, grazing, or wood products.

The subclasses indicate major kinds of limitations within the classes. Within most of the classes, there can be as many as four subclasses. The subclass is indicated by adding a small letter, *e*, *w*, *s*, or *c* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless a close-growing plant cover is maintained; *w* means that water in or on the soil will interfere with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, stony, or has low fertility that is difficult to correct; and *c*, used in only some parts of the country, indicates that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few or no limitations. Class V can contain, at the most, only subclasses *w*, *s*, and *c*, because the soils in it have little or no erosion hazard but have other limitations that limit their use largely to pasture, range, woodland, or wildlife.

Within the subclasses are the capability units, groups of soils enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other response to management. Thus, the capability unit is a convenient grouping for many statements about management of soils. Capability units are generally identified by numbers assigned locally, for example, IIe-1 or IIIw-2.

The eight classes in the capability system and the subclasses and units in this county are described in the list that follows.

Class I: Soils with few limitations that restrict their use.
- Unit I-1: Nearly level, well drained to moderately well drained soil in pockets or draws.

Class II: Soils with moderate limitations that reduce the choice of plants or that require moderate conservation practices.
- Subclass IIe: Soils moderately limited by risk of erosion if they are not protected.
  - Unit IIe-1: Gently sloping, moderately eroded soils that have loamy surface layers and subsoils of red clay.
  - Unit IIe-2: Gently sloping, slightly to moderately eroded soils that have loamy surface layers and subsoils of brown or mottled yellow and red sandy clay to sandy clay loam.
  - Unit IIe-3: Gently sloping, moderately eroded soil that has a loamy surface layer and a subsoil of yellowish-brown, mottled, very firm sandy clay.
- Subclass IIw: Soils moderately limited by excess water.
  - Unit IIw-2: Moderately well drained to well drained bottom-land soils that are susceptible to occasional overflow.
- Subclass IIs: Soils moderately limited by depth or low water-holding capacity.
  - Unit IIs-1: Somewhat excessively drained, sandy soil.

Class III: Soils with severe limitations that reduce the choice of plants, or that require special conservation practices, or both.
- Subclass IIIe: Soils severely limited by risk of erosion if they are tilled and not protected.
  - Unit IIIe-1: Sloping, slightly to severely eroded soils that have loamy surface layers and subsoils of red clay.
  - Unit IIIe-2: Sloping, slightly to moderately eroded soils that have surface layers of sandy loam or loamy sand and dark-brown or mottled red and yellow subsoils.
  - Unit IIIe-3: Shallow to deep, moderately eroded soils that have loamy surface layers and subsoils of yellowish-brown to yellowish-red clay to sandy clay.
  - Unit IIIe-5: Shallow, moderately eroded soils that have thin and discontinuous subsoils.
- Subclass IIIw: Soils severely limited by excess water.
  - Unit IIIw-2: Loamy soils on first bottoms that are subject to overflow.
  - Unit IIIw-3: Somewhat poorly drained soils that have mottled, compact subsoils.

Class IV: Soils with very severe limitations that restrict the choice of plants, or that require very careful management, or both.
- Subclass IVe: Soils very severely limited by risk of erosion if they are not protected.
  - Unit IVe-1: Sloping soils that have loamy surface layers and yellowish-brown to dark-red subsoils of sandy clay or clay.
  - Unit IVe-2: Shallow to moderately deep, sloping soils that are moderately to severely eroded.
  - Unit IVe-4: Shallow, sloping soils that are slightly to moderately eroded.

Subclass IVw: Soils very severely limited by excess water.

Unit IVw–1: Poorly drained soil on first bottoms, subject to frequent overflow.

Subclass IVs: Soils very severely limited by depth or low water-holding capacity.

Unit IVs–1: Deep, sandy soils on first bottoms, subject to occasional overflow.

Class V: Soils that have little or no hazard of erosion but that have other limitations that restrict their use to pasture, range, woodland, or wildlife (none in Douglas County).

Class VI: Soils that have severe limitations that make them generally unsuited to cultivation and that limit their use largely to pasture, range, woodland, or food and cover for wildlife.

Subclass VIe: Soils not suitable for cultivation and limited chiefly by the risk of erosion.

Unit VIe–1: Shallow, stony soils that have thin and discontinuous subsoils and slight to moderate erosion.

Unit VIe–2: Strongly sloping or very severely eroded soils that have loamy surface layers and subsoils of clay or sandy clay.

Unit VIe–3: Shallow, steep soils that have thin and discontinuous subsoils that overlie weathered mica schist.

Unit VIe–4: Shallow, strongly sloping soil that has a thin and discontinouus, clayey subsoil and moderate erosion.

Class VII: Soils with very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife.

Subclass VIIe: Soils very severely limited by the risk of erosion if they are not protected.

Unit VIIe–1: Strongly sloping, severely eroded soils.

Unit VIIe–2: Shallow, dominantly stony soils that have thin and discontinuous subsoils.

Class VIII: Soils and land types with limitations that preclude their use for commercial plants and that restrict their use to recreation, wildlife, water supply, or esthetic purposes.

Subclass VIIIs: Soils or land types that support little vegetation.

Unit VIIIs–1: Miscellaneous land types.

Management by capability units

The soils in Douglas County are in 24 capability units. The soils in a given capability unit have about the same limitations and risks of damage, need about the same management, and respond to management in about the same way. In the following pages each capability unit is described, the soils in it are named, and management for the group is suggested.

CAPABILITY UNIT I–1

Nearly level, well drained to moderately well drained soil in pockets or draws

Only one soil—Local alluvial land—is in this capability unit. This soil is deep, well drained to moderately well drained, and strongly acid. It is in slight depressions around the heads of drainageways and has slopes ranging from 2 to 6 percent.

The plow layer, to a depth of 6 to 8 inches, is very friable sandy loam or loamy sand. The subsoil varies in texture and consistence but is commonly friable sandy loam to sandy clay loam. Plant roots can penetrate effectively to a depth of 36 inches or more. In most places mica schist, granite, gneiss, or other hard or unweathered, igneous or metamorphic rocks are at a depth of about 10 feet.

This soil has slow surface runoff, a moderate rate of infiltration, and moderate permeability. It is high in moisture-supplying capacity. The supply of organic matter is low to medium, and the supply of available plant nutrients is medium. The soil has good tilth. Crops grown on it respond well to fertilizer.

This soil is suited to corn, grain sorghum, oats, rye, and peaches. It is also suited to fescue, bermudagrass, ryegrass, dallisgrass, rescuegrass, bahiagrass, annual lespedeza, white clover, crimson clover, sericea lespedeza, vetch, and similar plants grown for hay and pasture. It is moderately well suited to most other crops grown locally and is well suited to yellow-poplar and to loblolly and shortleaf pines. About 85 percent of the acreage is wooded, and the rest is used for cultivated crops.

This soil can be used to grow row crops almost continuously if a cover crop is grown occasionally. The cover crop will help maintain the supply of organic matter and good soil tilth. If high yields are to be maintained, the soil needs lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting. The soil is suited to sprinkler irrigation if there is a supply of water nearby.

Examples of suitable cropping systems follow:

1. First Year: Grain sorghum cultivated shallow and laid by early. Drill oats in the sorghum stubble that has been mowed, disked, and ripped.
   Second Year: Oats for hay or grain. After the oats have been harvested, leave the stubble unplowed throughout the winter.
   Third Year: Corn cultivated shallow and laid by early. After the corn has been harvested, mow the stubble and leave it unplowed throughout the winter.
2. First Year: Corn or grain sorghum cultivated shallow and laid by early. After the grain has been harvested, mow the stubble and leave it unplowed throughout the winter.
   Second Year: Corn or grain sorghum cultivated shallow and laid by early. Drill oats or rye in the stubble that has been mowed, disked, and ripped.
   Third Year: Oats or rye for grain. Late in winter, overseed the small grain with annual lespedeza.
   Fourth Year: Oats or rye followed by volunteer lespedeza. After the lespedeza has been harvested, leave the stubble unplowed throughout the winter.

This soil is suited to bicolor lespedeza, browntopmillet, partridgepeas, and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT IIe-1

Gently sloping, moderately eroded soils that have loamy surface layers and subsoils of red clay

In this capability unit are deep, well-drained soils that are medium to strongly acid and moderately eroded. The soils are on broad interstream divides or on high stream terraces. They have smooth slopes that range from 2 to 6 percent.

The plow layer, to a depth of 6 to 8 inches, is very friable sandy loam or friable loam. The subsoil is red to dark-red clay that is moderately permeable. It is friable to firm when moist and very hard when dry. Plant roots can penetrate effectively to a depth of 36 to 48 inches. In most places mica schist, diorite, hornblende gneiss, or similar hard or unweathered rocks are at a depth of more than 8 feet.

Quartz gravel covers between 20 and 30 percent of the surface of the Madison soil and makes up about 20 percent of the surface layer. The other soils vary in the amount of gravel they contain, but gravel commonly makes up less than 10 percent of the surface layer.

These soils have slow to medium surface runoff and a moderate rate of infiltration. They are moderately high in moisture-supplying capacity. The supply of organic matter is low, and the supply of available plant nutrients is low to medium. The soils have good tilth. Crops grown on them respond well to fertilizer.

The soils of this unit are:

Davidson loam, 2 to 6 percent slopes, eroded.
Lloyd sandy loam, 2 to 6 percent slopes, eroded.
Madison gravelly fine sandy loam, 2 to 6 percent slopes, eroded.
Wickham fine sandy loam, 2 to 6 percent slopes, eroded.

These soils are suited to all of the crops grown locally (fig. 8). They are also suited to yellow-poplar and to loblolly and shortleaf pines. About 40 percent of the acreage is pastured, about 20 percent is cultivated, and about 12 percent is in trees. The rest is idle.

The soils can be used to grow row crops either 1 year out of 2 or 2 years out of 3 if close-growing crops are grown the rest of the time. For continuous high yields, most of the crops need lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting. The soils are suited to sprinkler irrigation if there is a supply of water nearby.

Figure 8.—Cotton growing on Madison gravelly fine sandy loam, 2 to 6 percent slopes, eroded.

These soils need good water-control practices. Construct terraces so they will drain to vegetated outlets that were established previously. To establish vegetation in the outlets, double the normal rates of seeding and fertilization. Maintain the vegetation by adding fertilizer and lime regularly in amounts indicated by soil tests. All tillage should be on the contour. Build farm roads and fences on the crests of slopes, at the places where the terraces divide, or on the contour.

Examples of suitable cropping systems follow:

1. First Year: Cotton. Drill oats in the cotton stubble that has been mowed, disked, and ripped.
   Second Year: Oats for grain or hay. Overseed with lespedeza.
   Third Year: Corn cultivated shallow and laid by early. After the corn has been harvested, mow the stubble and leave it unplowed throughout the winter.
2. First Year: Cotton followed by crimson clover, or vetch drilled in mowed cotton stubble.
   Second Year: Legume turned under in April. Corn planted about May 1, cultivated shallow, and laid by early. Drill oats in the corn stubble that has been mowed, disked, and ripped.
   Third Year: Oats for seed or for grazing. Overseed in February with annual lespedeza.
   Fourth Year: Volunteer lespedeza for hay or for grazing.

These soils are suited to bicolor lespedeza and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT IIe-2

Gently sloping, slightly to moderately eroded soils that have loamy surface layers and subsoils of brown or mottled yellow and red sandy clay to sandy clay loam

Deep, well drained to moderately well drained, strongly acid soils that are slightly to moderately eroded are in this capability unit. The soils are on broad interstream divides or on low stream terraces. They have smooth slopes that range from 0 to 6 percent.

The plow layer, to a depth of 7 to 8 inches, is very friable sandy loam or fine sandy loam. The subsoil is yellowish-brown or strong-brown, mottled clay that is friable to firm. The subsoil has moderately slow to moderately rapid permeability. Plant roots can penetrate effectively to a depth of 33 to 36 inches. In most places granite, gneiss, or other hard or unweathered, igneous or metamorphic rocks are at a depth of more than 6 feet.

These soils have slow to medium surface runoff and a moderate to moderately rapid rate of infiltration. They are moderately high to high in moisture-supplying capacity. The supply of organic matter and available plant nutrients is low to medium. The soils have good tilth. Crops grown on them respond well to fertilizer.

The soils of this unit are:

Altavista fine sandy loam, 2 to 6 percent slopes, eroded.
Appling sandy loam, 2 to 6 percent slopes, eroded.
State fine sandy loam, 0 to 6 percent slopes.

These soils are suited to corn, grain sorghum, oats, and rye. They are also suited to fescue, ryegrass, rescuegrass, bahiagrass, annual lespedeza, crimson clover, sericea lespedeza, and vetch grown for pasture or hay. The

soils are moderately well suited to most other crops grown locally, but they are not suited to wheat and alfalfa. Poplar and loblolly and shortleaf pines grow well. About 50 percent of the acreage is cultivated, 15 percent is pastured, 24 percent is in trees, and the rest is idle.

The soils in this unit can be used to grow row crops either 1 year out of 2 or 2 years out of 3 if close-growing crops are grown the rest of the time. For continuous high yields, most of the crops need lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting. The soils are suited to sprinkler irrigation if there is a supply of water nearby.

These soils need good water-control practices. Construct terraces so they will drain to vegetated outlets that were established previously. To establish vegetation in the outlets, double the normal rates of seeding and fertilization. Maintain the vegetation by adding fertilizer and lime regularly in amounts indicated by soil tests. All tillage should be on the contour. Build farm roads and fences on the crests of slopes, at the places where the terraces divide, or on the contour.

Examples of suitable cropping systems follow:

1. First Year: Corn or grain sorghum cultivated shallow and laid by early. After the corn or sorghum has been harvested, mow the stubble and leave it unplowed throughout the winter.
   Second Year: Truck crops or cotton followed by oats or rye drilled in the stubble that has been mowed or disked.
   Third Year: Oats or rye overseeded with lespedeza. Follow lespedeza with oats or rye drilled on unplowed stubble.
   Fourth Year: Oats or rye followed by volunteer lespedeza. After the lespedeza has been harvested, leave the stubble unplowed throughout the winter.
2. First Year: Fully established Coastal bermudagrass for grazing or hay.
   Second Year: Early corn. Late in summer, graze or mow the stubble after the corn has been harvested.

These soils are suited to bicolor lespedeza and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT IIe-3

Gently sloping, moderately eroded soil that has a loamy surface layer and a subsoil of yellowish-brown, mottled, very firm sandy clay

Only one soil—Helena sandy loam, 2 to 6 percent slopes, eroded—is in this capability unit. This deep to moderately deep soil is moderately well drained to somewhat poorly drained and is strongly acid and moderately eroded. The soil is on low divides or in similar areas. It has smooth slopes that range from 2 to 6 percent.

The plow layer, to a depth of 5 to 7 inches, is brown or grayish-brown, very friable sandy loam. The subsoil is yellowish-brown, very firm to extremely firm clay or sandy clay and has moderately slow permeability. Plant roots can penetrate effectively to a depth of 15 to 25 inches. In most places aplitic granite, gneiss, or other hard or unweathered, igneous or metamorphic rocks are at a depth of more than 5 feet.

This soil has slow to medium surface runoff and a moderately rapid rate of infiltration. It is moderate in moisture-supplying capacity. The supply of organic matter is low to medium, and the supply of available plant nutrients is low. The soil has good tilth. Crops grown on it respond well to fertilizer. A few areas are gravelly, and in some areas there are a few stones.

This soil is suited to grain sorghum and ryegrass. It is moderately well suited to cotton, corn, oats, rye, fescue, bermudagrass, dallisgrass, rescuegrass, bahiagrass, annual lespedeza, crimson clover, and sericea lespedeza. It is generally not suited to wheat, alfalfa, whiteclover, and kudzu. The soil is suited to shortleaf and loblolly pines. About 50 percent of the acreage is in trees, 10 percent is pastured, 5 percent is cultivated, and the rest is idle.

This soil can be used to grow row crops either 1 year out of 2 or 2 years out of 4 if close-growing crops are grown the rest of the time. If moderate yields are to be maintained, the soil needs lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting.

This soil needs good water-control practices. Construct terraces so they will drain to vegetated outlets that were established previously. To establish vegetation in the outlets, double the normal rates of seeding and fertilization. Maintain the vegetation by adding fertilizer and lime regularly in amounts indicated by soil tests. All tillage should be on the contour. Build farm roads and fences on the crests of slopes, at the places where the terraces divide, or on the contour.

An example of a suitable cropping system follows:

1. First Year: Corn cultivated shallow and laid by early. Drill oats in the corn stubble that has been mowed, disked, and ripped.
   Second Year: Oats for hay or seed. Plant grain sorghum in the oats stubble that has been mowed, disked, and ripped. After the grain sorghum has been harvested, drill oats in the sorghum stubble that has been mowed, disked, and ripped.
   Third Year: Oats overseeded with lespedeza.
   Fourth Year: Oats followed by volunteer lespedeza. After the lespedeza has been harvested, leave the stubble unplowed throughout the winter.

This soil is moderately well suited to bicolor lespedeza and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT IIw-2

Moderately well drained to well drained bottom-land soils that are susceptible to occasional overflow

Deep, moderately well drained to well drained, strongly acid soils are in this capability unit. The soils are on flood plains. Their slopes range from 0 to 2 percent.

The plow layer, to a depth of 6 to 9 inches, is very friable silt loam, sandy loam, or loamy sand. The subsoil is brown to brownish-gray silt loam or sandy loam that is very friable and moderately to rapidly permeable. Plant roots can penetrate effectively to a depth of 30 to 36 inches.

These soils have slow runoff and a rapid to moderately rapid rate of infiltration. They are high in moisture-supplying capacity but are low to medium in organic

matter and available plant nutrients. The soils have good tilth. Crops grown on them respond well to fertilizer.

The soils of this unit are:

Alluvial land, moderately well drained.
Congaree soils.

These soils are suited to corn, grain sorghum, oats, rye, bermudagrass, ryegrass, dallisgrass, fescue, bahiagrass, annual lespedeza, whiteclover, sericea lespedeza, vetch, and Caley-peas. They are poorly suited to alfalfa and cotton. The soils are suited to yellow-poplar and loblolly pine. About 50 percent of the acreage is in trees, 30 percent is in cultivated crops, and 20 percent is in pasture.

The soils in this unit can be used to grow row crops year after year if a cover crop is grown occasionally. The cover crop and crop residues will help maintain the supply of organic matter and good soil tilth. For high yields, most of the crops need lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting. The soils need a simple system of ditches to remove excess surface water. They are generally well suited to sprinkler irrigation, and the nearby streams provide a source of water.

Examples of suitable cropping systems follow:

1. Corn planted each year, cultivated shallow and laid by early. The first year, after the corn is harvested, drill reseeding crimson clover in the corn stubble that has been mowed. Leave the clover in the field until the seed is mature the first year and each third year thereafter. This will assure a volunteer crop of crimson clover every year. Each year, after the corn has been harvested, mow the stubble. Three or four weeks before corn is again planted, turn the green clover under. Allow clover seed to mature 1 year out of 3.
2. First Year: Corn or truck crops. Drill oats in the stubble that has been disked and ripped.
   Second Year: Oats harvested for grain. Leave stubble unplowed throughout the winter.

These soils are suited to bicolor lespedeza, smartweed, and similar plants that provide food and cover for wildlife.

CAPABILITY UNIT IIs-1

Somewhat excessively drained, sandy soil

Only one soil—Molena loamy sand, 2 to 6 percent slopes—is in this capability unit. This soil is deep, somewhat excessively drained, and strongly acid. It is on high terraces. It has smooth slopes that range from 2 to 6 percent.

The plow layer, to a depth of 6 to 8 inches, is dark grayish-brown, very friable loamy sand. The subsoil is dark-brown, very friable loamy sand to sandy loam and has rapid permeability. Plant roots can penetrate effectively to a depth of 42 inches or more.

This soil has slow to medium surface runoff, a rapid rate of infiltration, and low moisture-supplying capacity. It is low in organic matter and in available plant nutrients. The soil has good tilth. Crops grown on it respond well to fertilizer.

This soil is suited to cotton, corn, oats, grain sorghum, ryegrass, bermudagrass, bahiagrass, annual lespedeza, crimson clover, sericea lespedeza, and kudzu. It is moderately well suited to most other crops grown locally, and loblolly and shortleaf pines grow well.

This soil can be used to grow row crops either 1 year out of 2 or 2 years out of 3 if close-growing crops are grown the rest of the time. If moderate yields are to be maintained, the soil needs lime occasionally and a complete fertilizer regularly. Because of leaching, fertilizer should be added in split applications. Legumes need nitrogen only at the time of planting.

This soil needs good water-control practices. Construct terraces so they will drain to vegetated outlets that were established previously. To establish vegetation in the outlets, double the normal rates of seeding and fertilization. Maintain the vegetation by adding fertilizer and lime regularly in amounts indicated by soil tests. All tillage should be on the contour. Build farm roads and fences on the crests of slopes, at the places where the terraces divide, or on the contour.

This soil needs organic matter to improve the moisture-supplying capacity. To supply organic matter, turn under green manure or cover crops at least 1 year out of 2. Leave all crop residues on the surface or mix them into the plow layer. The soil generally is well suited to sprinkler irrigation.

An example of a suitable cropping system follows:

1. First Year: Corn or grain sorghum.
2. Second and Third Years: Coastal bermudagrass for hay or grazing.

This soil is suited to bicolor lespedeza and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT IIIe-1

Sloping, slightly to severely eroded soils that have loamy surface layers and subsoils of red clay

Deep, well-drained, strongly acid soils that are slightly to severely eroded are in this capability unit. The soils are on broad interstream divides or on high stream terraces. They have slopes ranging from 2 to 10 percent.

The plow layer, to a depth of 5 to 8 inches, is very friable loam or sandy loam or friable clay loam. The subsoil is friable to firm, red clay that is moderately permeable. Plant roots can penetrate effectively to a depth of 30 inches or more.

These soils have medium runoff and a moderate to moderately rapid rate of infiltration. Their moisture-supplying capacity is moderately high. The soils are low in available plant nutrients and in organic matter. Except in areas where they are severely eroded, the soils have good tilth. Crops grown on them respond well to fertilizer. In the severely eroded areas, the plow layer is made up chiefly of material from the subsoil, tillage is difficult, and the soil can be cultivated only within a narrow range of moisture content.

Quartz gravel covers 20 to 30 percent of the surface and makes up about 20 percent of the surface layer of the Madison soils in this unit. The other soils contain varying amounts of gravel, but, in most places, less than 10 percent of the surface layer consists of gravel.

The soils of this unit are:

Davidson clay loam, 2 to 6 percent slopes, severely eroded.
Davidson clay loam, 6 to 10 percent slopes, severely eroded.
Davidson loam, 6 to 10 percent slopes, eroded.
Lloyd clay loam, 2 to 6 percent slopes, severely eroded.
Lloyd clay loam, 6 to 10 percent slopes, severely eroded.
Lloyd sandy loam, 6 to 10 percent slopes, eroded.
Madison gravelly fine sandy loam, 6 to 10 percent slopes.
Madison gravelly fine sandy loam, 6 to 10 percent slopes, eroded.
Madison gravelly sandy clay loam, 2 to 6 percent slopes, severely eroded.
Wickham fine sandy loam, 6 to 10 percent slopes, eroded.
Wickham clay loam, 2 to 6 percent slopes, severely eroded.

These soils are suited to all of the crops commonly grown in the county. Bermudagrass, sericea lespedeza, crimson clover, bahiagrass, tall fescue, annual lespedeza, alfalfa, and similar crops for pasture and hay grow well (fig. 9). The soils are suited to poplar and to loblolly and shortleaf pines. About 24 percent of the acreage is cultivated, 11 percent is pastured, 44 percent is in trees, and the rest is idle.

Figure 9.—**Closely grazed bermudagrass and annual lespedeza on Madison gravelly fine sandy loam, 6 to 10 percent slopes, eroded. Quartz pebbles and cobblestones cover an estimated 25 percent of the surface of this soil, but yields of more than 135 cow-acre-days of grazing are obtained if the soil is well managed.**

The soils in this unit can be used to grow row crops either 1 year out of 3 or 2 years out of 4 if close-growing crops are grown the rest of the time. If high yields are to be maintained, lime should be added occasionally and a complete fertilizer added regularly. Legumes need nitrogen only at the time of planting. Alfalfa needs an application of boron.

These soils need good water-control practices. Construct terraces so they will drain to vegetated outlets that were established previously. To establish vegetation in the outlets, double the normal rates of seeding and fertilization. Maintain the vegetation by adding fertilizer and lime regularly in amounts indicated by soil tests. All tillage should be on the contour. Build farm roads and fences on the crests of slopes, at the places where the terraces divide, or on the contour.

Examples of suitable cropping systems follow:

1. First Year: Corn or grain sorghum cultivated shallow and laid by early. After the corn or grain sorghum has been harvested, mow the stubble and leave the soil unplowed throughout the winter.
   Second Year: Cotton or corn followed by a small grain and fescue.
   Third Year: Small grain for seed; fescue.
   Fourth Year: Fescue for grazing, hay, or seed.
2. First Year: Cotton or corn. Drill small grain in mowed stubble.
   Second Year: Small grain, harvested for seed, followed by alfalfa.
   Third through the Sixth Year: Alfalfa.

These soils are suited to bicolor lespedeza and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT IIIe-2

Sloping, slightly to moderately eroded soils that have surface layers of sandy loam or loamy sand and dark-brown or mottled red and yellow subsoils

In this capability unit are deep, well-drained to somewhat excessively drained, strongly acid soils that are slightly to moderately eroded. The soils are on broad divides or on high terraces. They have smooth slopes that range from 6 to 10 percent.

The plow layer, to a depth of 6 to 8 inches, is yellowish-brown or dark grayish-brown, very friable sandy loam or loamy sand. The subsoil is sandy clay to loamy sand that is very friable to firm and moderately to rapidly permeable. Plant roots can penetrate effectively to a depth of 33 to 42 inches. In most places in the Appling soils, granite, gneiss, or other hard or unweathered, igneous or metamorphic rocks are at a depth of more than 6 feet. In the Molena soil, bedrock is generally at a depth of more than 20 feet.

These soils have medium surface runoff, a moderate to rapid rate of infiltration, and low to moderately high moisture-supplying capacity. They are low in organic matter and in available plant nutrients. The soils have good tilth. Crops grown on them respond well to fertilizer. The Appling soil has a few gravelly areas.

The soils of this unit are:

Appling sandy loam, 6 to 10 percent slopes, eroded.
Molena loamy sand, 6 to 10 percent slopes.

These soils are suited to cotton, corn, grain sorghum, oats, rye, ryegrass, bermudagrass, bahiagrass, annual lespedeza, crimson clover, sericea lespedeza, and kudzu. They are moderately well suited to most of the other crops grown locally. Loblolly and shortleaf pines grow well.

Row crops can be grown on these soils either 1 year out of 3 or 2 years out of 4 if close-growing crops are grown the rest of the time. For moderate to high yields, most of the crops need lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting.

These soils need good water-control practices. Construct terraces so they will drain to vegetated outlets

that were established previously. To establish vegetation in the outlets, double the normal rates of seeding and fertilization. Maintain the vegetation by adding fertilizer and lime regularly in amounts indicated by soil tests. All tillage should be on the contour. Build farm roads and fences on the crests of slopes, at the places where the terraces divide, or on the contour.

Examples of suitable cropping systems follow:

1. First Year: Corn or grain sorghum cultivated shallow and laid by early. After the corn or grain sorghum has been harvested, mow the stubble and leave it unplowed throughout the winter.
   Second Year: Cotton. Drill oats and bahiagrass together in cotton stubble that has been mowed.
   Third Year: Oats for seed; bahiagrass.
   Fourth Year: Bahiagrass for grazing, seed, or hay.
2. First Year: Fully established Coastal bermudagrass.
   Second Year: Corn or grain sorghum.
   Third Year: Coastal bermudagrass.

These soils are suited to bicolor lespedeza and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT IIIe-3

Shallow to deep, moderately eroded soils that have loamy surface layers and subsoils of yellowish-brown to yellowish-red clay to sandy clay

In this capability unit are shallow to deep, moderately well drained to somewhat excessively drained soils that are moderately eroded and medium to strongly acid. The soils are on the lower parts of slopes or on smooth divides. Their slopes range from 6 to 10 percent.

The plow layer, to a depth of 5 to 7 inches, is brown or grayish-brown, very friable sandy loam. The subsoil is yellowish-red to yellowish-brown sandy clay or clay that is firm to extremely firm. Plant roots can penetrate effectively to a depth of 15 to 20 inches. In most places aplitic granite, gneiss, diorite, hornblende gneiss, mica schist, or other hard or unweathered, igneous or metamorphic rocks are at a depth of more than 20 inches.

These soils have slow to medium surface runoff, a moderately slow to moderately rapid rate of infiltration, and moderate to moderately slow permeability. They are low in available plant nutrients and low to medium in organic matter. The soils have fair to good tilth. Crops grown on them make fair to good response to fertilizer. In places there are a few stones. A few of the areas are gravelly.

The soils of this unit are:

Helena sandy loam, 6 to 10 percent slopes, eroded.
Mecklenburg sandy loam, 6 to 10 percent slopes, eroded.

These soils are suited to grain sorghum and ryegrass, but they are generally not suited to wheat, alfalfa, and kudzu. They are moderately well suited to pasture and to most other crops grown locally. Shortleaf and loblolly pines grow well. About 35 percent of this acreage is cultivated, 33 percent is in trees, and the rest is idle.

Row crops can be grown on these soils 1 year out of 3 if close-growing crops are grown the rest of the time. For moderate yields, most of the crops need lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting.

These soils need good water-control practices. Construct terraces so they will drain to vegetated outlets that were established previously (fig. 10). To establish vegetation in the outlets, double the normal rates of seeding and fertilization. Maintain the vegetation by adding fertilizer and lime regularly in amounts indicated by soil tests. All tillage should be on the contour. Build farm roads and fences on the crests of slopes, at the places where the terraces divide, or on the contour.

Figure 10.—Terrace in a field of Mecklenburg sandy loam, 6 to 10 percent slopes, eroded. Cotton is growing on the left side of the terrace, and corn, on the right.

Examples of suitable cropping systems follow:

1. First Year: Grain sorghum or corn, followed by fescue.
   Second through the Fourth Year: Fescue for grazing, seed, or hay.
2. First Year: Grain sorghum or corn, cultivated shallow and laid by early. Drill oats and bahiagrass together in the corn or sorghum stubble that has been mowed, disked, and ripped.
   Second Year: Oats for grazing, seed, or silage; bahiagrass.
   Third and Fourth Years: Bahiagrass for grazing, seed, or hay.

These soils are moderately well suited to bicolor lespedeza and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT IIIe-5

Shallow, moderately eroded soils that have thin and discontinuous subsoils

Only one mapping unit—Louisburg complex, 2 to 6 percent slopes, eroded—is in this capability unit. The soils in this complex are shallow, well drained to somewhat excessively drained, strongly acid, and moderately eroded. They are on interstream divides and have slopes ranging from 2 to 6 percent.

The plow layer, to a depth of 5 to 8 inches, is very friable sandy loam or loamy sand. The subsoil is brown

sandy clay loam to clay. It is thin and discontinuous, very friable to very firm, and moderately to rapidly permeable. Because hard or partly weathered granite is at a shallow depth in these soils, plant roots can penetrate effectively only to a depth of 12 to 15 inches.

The soils in this complex have slow to medium surface runoff, a moderate to rapid rate of infiltration, and low moisture-supplying capacity. They are low in available plant nutrients and organic matter. Except in a few stony areas, tilth is generally good. A few of the areas are gravelly. Crops on these soils respond well to fertilizer, but the effects of the fertilizer do not last long.

The soils in this complex are suited to grain sorghum and are moderately well suited to cotton, corn, oats, rye, tall fescue, bermudagrass, ryegrass, bahiagrass, rescuegrass, annual lespedeza, sericea lespedeza, and crimson clover. In general, they are not suited to wheat, alfalfa, whiteclover, kudzu, and dallisgrass. Suitable trees are shortleaf and loblolly pines. About 15 percent of the acreage is cultivated, 10 percent is pastured, 45 percent is in trees, and the rest is idle.

Row crops can be grown on these soils 1 year out of 3 if close-growing crops are grown the rest of the time. For moderate yields, the soils need lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting.

These soils need good water-control practices. Construct terraces so they will drain to vegetated outlets that were established previously. To establish vegetation in the outlets, double the normal rates of seeding and fertilization. Maintain the vegetation by adding fertilizer and lime regularly in amounts indicated by soil tests. All tillage should be on the contour. Build farm roads and fences on the crests of slopes, at the places where the terraces divide, or on the contour.

Examples of suitable cropping systems follow:

1. First Year: Grain sorghum or corn, followed by fescue.
   Second through the Fourth Year: Fescue for grazing, seed, or hay.
2. First Year: Grain sorghum or corn. Drill oats and bahiagrass together in the sorghum or corn stubble that has been mowed, disked, and ripped.
   Second Year: Oats for grazing, seed, or silage; bahiagrass.
   Third and Fourth Years: Bahiagrass for grazing, seed, or hay.

This soil is moderately well suited for bicolor lespedeza and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT IIIw-2

Loamy soils on first bottoms that are subject to overflow

Deep, somewhat poorly drained, strongly acid soils are in this capability unit. The soils are on flood plains. They have slopes ranging from 0 to 2 percent.

The plow layer, to a depth of 6 to 8 inches, is dark-brown to light yellowish-brown, very friable silt loam to loamy sand. The subsoil is grayish-brown silt loam to loamy sand. It is very friable and is moderately to rapidly permeable. Because of the high water table, plant roots can penetrate effectively only to a depth of about 24 inches.

These soils have slow surface runoff, moderate to rapid permeability and rate of infiltration, and high moisture-supplying capacity. They are medium to low in organic matter and in available plant nutrients. The soils generally have good tilth. Crops grown on them respond well to fertilizer.

The soils of this unit are:

Alluvial land, somewhat poorly drained.
Chewacla soils.

These soils are suited to corn, grain sorghum, fescue, bermudagrass, dallisgrass, rescuegrass, bahiagrass, annual lespedeza, whiteclover, vetch, and Caley-peas. They are generally not suited to cotton, wheat, alfalfa, sericea lespedeza, kudzu, and crimson clover. Loblolly pine and poplar grow well. About 85 percent of the acreage is in trees, 9 percent is in pasture, and 6 percent is in other crops.

Row crops can be grown on these soils year after year if cover crops and crop residues are turned under. The cover crops and crop residues will help to maintain the supply of organic matter and good tilth. To maintain high yields, most crops need lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting. The soils need a system of ditches to remove excess surface water and to improve internal soil drainage. They generally are well suited to sprinkler irrigation.

Examples of suitable cropping systems follow:

1. First Year: Corn or grain sorghum, followed by tall fescue and whiteclover drilled in the corn or sorghum stubble that has been disked and ripped.
   Second and Third Years: Tall fescue and whiteclover.
2. First Year: Corn or grain sorghum cultivated shallow and laid by early. Drill oats and bahiagrass together in the corn or sorghum stubble that has been mowed, disked and ripped.
   Second Year: Oats for seed or silage; bahiagrass.
   Third and Fourth Years: Bahiagrass for seed, hay, or grazing.

These soils are suited to bicolor lespedeza, smartweed, and similar plants that provide food and cover for wildlife.

CAPABILITY UNIT IIIw-3

Somewhat poorly drained soils that have mottled, compact subsoils

Moderately deep to deep, somewhat poorly drained, strongly acid to very strongly acid soils are in this capability unit. The soils are on low terraces, around the heads of drainageways, and on low saddles between areas of higher elevation. They have slopes ranging from 0 to 6 percent.

The plow layer, to a depth of 5 to 8 inches, is grayish-brown silt loam or very dark grayish-brown sandy loam that is very friable. The subsoil is pale-brown to olive-gray sandy clay loam or sandy clay. It is friable to firm and is moderate to moderately slow in permeability. Plant roots can penetrate effectively to a depth of 22 to 30 inches. In most places granite, gneiss, or other hard or igneous rocks are at a depth of more than 10 feet.

These soils have slow to very slow surface runoff, a moderate to moderately slow rate of infiltration, and

high moisture-supplying capacity. They are low in available plant nutrients and low to moderately high in organic matter. The soils generally have good tilth. Crops grown on them make a good to fair response to fertilizer.

The soils of this unit are:

Augusta silt loam.
Colfax sandy loam, 2 to 6 percent slopes.

These soils are suited to grain sorghum, fescue, and dallisgrass but are generally not suited to wheat, alfalfa, cotton, oats, and kudzu. They are moderately well suited to corn, rye, bermudagrass, ryegrass, rescuegrass, bahiagrass, annual lespedeza, white clover, crimson clover, and sericea lespedeza. Yellow-poplar and loblolly and shortleaf pines grow well.

Row crops can be grown on these soils either 1 year out of 3 or 2 years out of 4 if they are not grown in the same place more than 2 years in succession. To maintain moderate yields, most crops grown on these soils need lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting. A system of ditches is needed to remove excess surface water and to improve internal soil drainage (fig. 11).

Figure 11.—**Corn growing next to a shallow drainage ditch in a field of Augusta silt loam (0 to 2 percent slopes). The ditch needs to be deepened to provide better drainage.**

An example of a suitable cropping system follows:

1. First Year: Grain sorghum or corn, followed by fescue and whiteclover drilled in the sorghum or corn stubble that has been ripped.

   Second and Third Years: Fescue and whiteclover.

These soils are moderately well suited to bicolor lespedeza, Japanese and browntop millet, and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT IVe-1

Sloping soils that have loamy surface layers and yellowish-brown to dark-red subsoils of sandy clay or clay

In this capability unit are slightly to moderately eroded, deep soils and severely to very severely eroded moderately deep soils. All the soils are well drained and strongly acid. They are on broad interstream divides or on high stream terraces and have slopes ranging from 6 to 15 percent.

The plow layer, to a depth of 5 to 7 inches, is friable clay loam or very friable loam or sandy loam. The subsoil is red or dark-red clay or mottled red and yellow sandy clay. It is moderately permeable and is friable to firm when moist and hard to very hard when dry. Plant roots can penetrate effectively to a depth of 24 to 34 inches. In most places mica schist, granite, gneiss, or other hard or unweathered, igneous or metamorphic rocks are at a depth of more than 5 feet.

Quartz gravel covers 20 to 30 percent of the surface of the Madison soils in this unit and makes up about 20 percent of the surface layer. The amount of gravel in the other soils varies, but gravel commonly makes up less than 10 percent of the surface layer.

These soils have medium to rapid surface runoff and a slow to moderate rate of infiltration. They are low to moderately high in moisture-supplying capacity. The soils are low to medium in organic matter and in available plant nutrients. Crops grown on them make good to fair response to fertilizer. Tilth is good, except where the soils are severely or very severely eroded. In the eroded areas the plow layer is made up mostly of former subsoil material, tillage is difficult, and the soils can be cultivated safely only within a narrow range of moisture content.

The soils of this unit are:

Appling sandy clay loam, 6 to 10 percent slopes, severely eroded.
Appling sandy loam, 10 to 15 percent slopes, eroded.
Lloyd clay loam, 6 to 10 percent slopes, very severely eroded.
Lloyd clay loam, 10 to 15 percent slopes, severely eroded.
Madison gravelly fine sandy loam, 10 to 15 percent slopes.
Madison gravelly fine sandy loam, 10 to 15 percent slopes, eroded.
Madison gravelly sandy clay loam, 6 to 10 percent slopes, severely eroded.
Wickham clay loam, 6 to 10 percent slopes, severely eroded.

These soils are better suited to sericea lespedeza, bermudagrass, bahiagrass, fescue, crimson clover, annual lespedeza, and kudzu than to row crops. They can be used to grow cotton, corn, small grains, peaches, or pecans if perennial crops are grown most of the time. The Lloyd, Madison, and Wickham soils are suited to alfalfa. All of the soils are suited to yellow-poplar and to loblolly and shortleaf pines. About 80 percent of the acreage is in trees, 10 percent is pastured, 5 percent is cropped, and the rest is idle.

If these soils are cultivated, row crops or clean-tilled crops should be grown no oftener than either 1 year out of 4 or 2 years out of 5. To maintain high yields, the soils need lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting. In addition, alfalfa needs an application of boron.

If these soils are cultivated, good water-control practices are needed. Seed the entire area to perennial vegetation. Leave the natural draws in perennial vegetation so they can be used as outlets for terraces when field crops are grown. Build and maintain the terraces so they will drain to the vegetated outlets. All tillage should be on the contour. Build farm roads and fences on the crests of slopes, at the places where the terraces divide, or on the contour. Fences can also be built next to natural drainageways.

Examples of suitable cropping systems follow:

1. First Year: Corn or cotton. After the corn or cotton has been harvested, mow the stubble and leave it unplowed throughout the winter.
   Second through the Sixth Year: Sericea lespedeza.
2. First Year: Corn or grain sorghum. After the corn or grain sorghum has been harvested, mow the stubble and leave it unplowed throughout the winter.
   Second Year: Cotton, followed by fescue and clover drilled in ripped and disked stubble.
   Third through the Fifth Year: Fescue and clover.

These soils are suited to bicolor lespedeza and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT IVe-2

Shallow to moderately deep, sloping soils that are moderately to severely eroded

Well-drained to somewhat poorly drained, strongly acid soils that are moderately to severely eroded are in this capability unit. The soils are on broken interstream divides or on the lower parts of slopes. They have slopes ranging from 6 to 10 percent.

The plow layer, to a depth of 4 to 6 inches, is dark reddish-brown, friable clay loam to grayish-brown, very friable sandy loam. The subsoil is dark-red to mottled reddish-brown sandy clay loam to clay. It is firm to extremely firm and has moderate to moderately slow permeability. Plant roots can penetrate effectively to a depth of about 16 inches. In most places aplitic granite, gneiss, or other hard or unweathered, igneous or metamorphic rocks are at a depth of more than 36 inches.

These soils have medium to rapid surface runoff and a moderate to moderately slow rate of infiltration. They are low to moderately low in moisture-supplying capacity. The soils are also low in organic matter and in available plant nutrients. They have fair tilth. Crops grown on them make fair response to fertilizer. In a few places there are a few loose stones or rock outcrops. A few of the areas are gravelly.

The soils of this unit are:

Helena soils, 6 to 10 percent slopes, severely eroded.
Musella clay loam, 6 to 10 percent slopes, eroded.

These soils are suited to grain sorghum and ryegrass but are generally not suited to wheat, alfalfa, and kudzu. They are moderately well suited to cotton, corn, oats, rye, fescue, bermudagrass, rescuegrass, bahiagrass, dallisgrass, white clover, annual lespedeza, crimson clover, sericea lespedeza, and vetch. The soils are suited to shortleaf and loblolly pines. About 60 percent of the acreage is in trees, 7 percent is cropped, and the rest is idle.

These soils need to be kept in perennial vegetation most of the time. Row crops can be grown as often as either 1 year out of 4 or 2 years out of 6 if perennial crops are grown the rest of the time. To maintain moderate yields, the soils need lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting.

If these soils are cultivated, good water-control practices are needed. Seed the entire area to perennial vegetation. Leave the natural draws in perennial vegetation so they can be used as terrace outlets when field crops are grown. Construct and maintain the terraces so they will drain to vegetated outlets. All tillage should be on the contour. Build farm roads and fences on the crests of slopes, at the places where the terraces divide, or on the contour. Fences can also be built next to natural drainageways.

Examples of suitable cropping systems follow:

1. First Year: Grain sorghum or corn, followed by fescue.
   Second through the Fourth Year: Fescue for grazing, seed, or hay.
2. First Year: Grain sorghum or corn, cultivated shallow and laid by early. Drill oats and bahiagrass together in the sorghum or corn stubble that has been mowed, disked, and ripped.
   Second Year: Oats for grazing, seed, or silage; bahiagrass.
   Third and Fourth Year: Bahiagrass for seed or hay.

These soils are moderately well suited to bicolor lespedeza and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT IVe-4

Shallow, sloping soils that are slightly to moderately eroded

Somewhat excessively drained, shallow, strongly acid, slightly to moderately eroded soils are in this capability unit. The soils are on narrow ridgetops and on short, broken slopes. The slopes range from 6 to 15 percent.

The plow layer, to a depth of 5 to 8 inches, is very friable loamy sand to sandy loam. In most places the subsoil is a thin and discontinuous layer of sandy clay loam, but its texture ranges from sandy loam to clay. Because the soils are shallow over partly weathered or hard granite, mica schist, or other igneous and metamorphic rocks, plant roots can penetrate effectively only to a depth of 12 to 24 inches.

These soils have medium surface runoff, rapid to moderately slow permeability, and a rapid to moderately slow rate of infiltration. They are low in moisture-supplying capacity and in available plant nutrients. The supply of organic matter varies in the less eroded Louisa soil, but it is low in the other soils in this capability unit. Because the soils vary, crops grown on them vary in their response to fertilizer. The soils generally have good tilth, but in some places stones, cobblestones, boulders, or rock outcrops hinder tillage.

The soils of this unit are:

Louisa fine sandy loam, 10 to 15 percent slopes.
Louisa fine sandy loam, 10 to 15 percent slopes, eroded.
Louisburg complex, 6 to 10 percent slopes, eroded.
Louisburg complex, 10 to 15 percent slopes, eroded.
Wilkes sandy loam, 6 to 10 percent slopes, eroded.

These soils are suited to grain sorghum and are moderately well suited to cotton, corn, oats, rye, and millet. They are also suited to tall fescue, bermudagrass, ryegrass, bahiagrass, rescuegrass, annual lespedeza, crimson clover, sericea lespedeza, and other crops for hay and pasture. Suitable trees are shortleaf and loblolly pines. About 70 percent of the acreage is in trees, 14 percent is cropped, 8 percent is pastured, and the rest is idle.

These soils need to be kept in perennial vegetation most of the time. Nevertheless, row crops can be grown as often as 1 year out of 4, or 2 years out of 6, if perennial crops are grown the rest of the time. To maintain moderate yields, these soils need lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting.

If these soils are cultivated, good water-control practices are needed. Seed the entire area to perennial vegetation. Leave the natural draws in perennial vegetation so they can be used as terrace outlets when field crops are grown. Construct and maintain the terraces so they will drain to the vegetated outlets. All tillage should be on the contour. Build farm roads and fences on the crests of slopes, at the places where the terraces divide, or on the contour. Fences can also be built next to natural drainageways.

Examples of suitable cropping systems follow:

1. First Year: Grain sorghum or corn, followed by fescue.
   Second, Third, and Fourth Years: Fescue for grazing, seed, or hay.
2. First Year: Grain sorghum or corn. Drill oats and bahiagrass together in the sorghum or corn stubble that has been mowed, disked, and ripped.
   Second Year: Oats for grazing, seed, or silage; bahiagrass.
   Third and Fourth Years: Bahiagrass for grazing, seed, or hay.

These soils are moderately well suited to bicolor lespedeza and other crops that provide food and cover for wildlife.

CAPABILITY UNIT IVw-1

Poorly drained soil on first bottoms, subject to frequent overflow

Only one soil—Wehadkee silty clay loam—is in this capability unit. This deep, poorly drained, very strongly acid soil is on the flood plains of the larger streams. It has slopes ranging from 0 to 2 percent.

The plow layer is gray, friable silty clay loam. The subsoil is light-gray, mottled silty clay loam that is slightly sticky and slowly permeable. Because the water table is high, plant roots can penetrate effectively only to a depth of about 8 inches. Bedrock is at a depth of more than 25 feet.

This soil has very slow surface runoff and a slow rate of infiltration. It is high in moisture-supplying capacity. It is also high in organic matter but is low in available plant nutrients. The soil has poor to good tilth. Crops grown on it respond fairly well to fertilizer.

If it has been drained, this soil is suited to fescue, dallisgrass, annual lespedeza, whiteclover, and vetch and is moderately well suited to corn. It is not suited to other crops grown locally.

This soil needs a complete system of ditches to remove excess surface water and to improve internal soil drainage. To maintain moderate yields, it needs lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting.

An example of a suitable cropping system follows:

1. First Year: Corn.
   Second through the Fourth Year: Fescue.

This soil is moderately well suited to bicolor lespedeza, smartweed, and similar plants that provide food and cover for wildlife.

CAPABILITY UNIT IVs-1

Deep, sandy soils on first bottoms, subject to occasional overflow

The only mapping unit—Buncombe loamy sands, 0 to 6 percent slopes—in this capability unit consists of deep, somewhat excessively drained, strongly acid soils. The soils are on flood plains and have slopes ranging from 0 to 6 percent.

The plow layer, to a depth of 6 to 8 inches, is olive-gray loamy sand that is very friable to loose. The subsoil is pale-yellow loamy fine sand to sand that is very friable and rapidly permeable. Plant roots can penetrate effectively to a depth of 48 inches or more.

These soils have very slow surface runoff and rapid permeability. They have a rapid rate of infiltration and are low in moisture-supplying capacity. The soils are also low in organic matter and available plant nutrients. They have good tilth. Crops grown on them respond well to fertilizer, but the effects of the fertilizer do not last long.

These soils are better suited to Coastal bermudagrass, bahiagrass, or other perennial vegetation than to cultivated crops. They are moderately well suited to corn, grain sorghum, oats, rye, annual lespedeza, crimson clover, and sericea lespedeza but are generally not suited to cotton, wheat, alfalfa, whiteclover, dallisgrass, and kudzu. Suitable trees are shortleaf and loblolly pines.

The soil needs lime occasionally and a complete fertilizer at least twice during the growing season. Legumes need nitrogen only at the time of planting. To build up organic matter, improve the soil structure, and increase the moisture-supplying capacity, these soils need to be kept in perennial vegetation 3 years out of 4, or 4 years out of 6. Leave crop residues on the surface or turn them under to provide organic matter.

An example of a suitable cropping system follows:

1. First Year: Corn or grain sorghum. After the corn or grain sorghum has been harvested, mow the stubble and leave it unplowed throughout the winter.
   Second through the Fourth Year: Coastal bermudagrass for hay or grazing.

These soils are moderately well suited to bicolor lespedeza and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT VIe-1

Shallow, stony soils that have thin and discontinuous subsoils and slight to moderate erosion

Shallow, well-drained to somewhat excessively drained, strongly acid, slightly to moderately eroded soils are in this unit. The soils are on broken interstream divides. They have slopes ranging from 6 to 25 percent.

The surface layer, to a depth of 4 to 7 inches, is dark reddish-brown, friable clay loam to reddish-brown, very friable fine sandy loam. The subsoil is dark-red sandy clay loam to clay. It is firm to very firm and is moderately permeable. In most places, because bedrock is near the surface, plant roots can penetrate effectively only to a depth of about 16 inches.

These soils have rapid surface runoff and a moderately slow to moderate rate of infiltration. They are low in moisture-supplying capacity. They are also low in organic matter and in available plant nutrients. Stones and gravel commonly cover more than 20 percent of the surface. Because of the stones and gravel, the soils have poor tilth. Crops grown on them make fair to good response to fertilizer.

The soils of this unit are:

Musella stony clay loam, 6 to 10 percent slopes, eroded.
Musella stony fine sandy loam, 15 to 25 percent slopes.

These soils generally are better suited to perennial vegetation than to cultivated crops. They are moderately well suited to bermudagrass, ryegrass, dallisgrass, rescuegrass, bahiagrass, annual lespedeza, white clover, crimson clover, and sericea lespedeza. Suitable trees are shortleaf and loblolly pines. About 75 percent of the acreage is in trees, 10 percent is in pasture, 5 percent is in crops, and the rest is idle.

If tillage and planting are done on the contour, pastures are good on these soils. Grazing should be controlled to prevent damage to the vegetation. To maintain moderate yields, the soils need lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting.

These soils are moderately well suited to bicolor lespedeza and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT VIe-2

Strongly sloping or very severely eroded soils that have loamy surface layers and subsoils of clay or sandy clay

This capability unit is made up of well-drained, strongly acid soils on interstream divides and in areas that adjoin drainageways. They have slopes ranging from 6 to 25 percent. The soils are slightly eroded to very severely eroded. Those slightly to moderately eroded are deep, and those severely to very severely eroded are moderately deep.

The surface layer, to a depth of 4 to 7 inches, is very friable gravelly fine sandy loam to dark-red, friable clay loam. The subsoil is dark-red to mottled red and yellowish-brown sandy clay to clay. It is moderately permeable and is friable to firm when moist and very hard when dry. Plant roots can penetrate effectively to a depth of 22 to 30 inches. In most places granite, gneiss, diorite, hornblende gneiss, mica schist, or other hard or unweathered rocks are at a depth of more than 5 feet.

The soils in this unit generally have rapid surface runoff, but on the less eroded Madison soils the runoff is medium. The rate of infiltration is slow to moderate, and the soils are low to moderate in moisture-supplying capacity. Except for the less eroded Madison soils, which are medium in content of organic matter, organic matter is low in all the soils. All of the severely and very severely eroded soils are low in available plant nutrients, but the other soils are moderately low. Tilth and the response to fertilizer are fair on the severely eroded soils and poor on the very severely eroded soils. It is good on the other soils. These soils have a few loose stones on the surface. Gravel covers 20 to 30 percent of the surface of the Madison soils.

The soils of this unit are:

Appling sandy clay loam, 10 to 15 percent slopes, severely eroded.
Davidson clay loam, 10 to 15 percent slopes, very severely eroded.
Lloyd clay loam, 10 to 15 percent slopes, very severely eroded.
Lloyd sandy loam, 15 to 25 percent slopes, eroded.
Madison gravelly fine sandy loam, 15 to 25 percent slopes.
Madison gravelly fine sandy loam, 15 to 25 percent slopes, eroded.
Madison gravelly sandy clay loam, 6 to 10 percent slopes, very severely eroded.
Madison gravelly sandy clay loam, 10 to 15 percent slopes, severely eroded.

These soils are better suited to trees and pasture than to cultivated crops. They are suited to fescue, bermudagrass, ryegrass, dallisgrass, rescuegrass, bahiagrass, annual lespedeza, crimson clover, sericea lespedeza, and kudzu. Shortleaf and loblolly pines grow well. About 94 percent of the acreage is in trees, 2 percent is in pasture, 1 percent is in crops, and the rest is idle.

In establishing pastures all tillage and planting should be done on the contour. The soils need to be protected at all times by a layer of mulch, plant residues, or other organic matter. Grazing should be controlled to prevent damage to the plant cover. To maintain moderate to high yields, these soils need lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting.

These soils are suited to bicolor lespedeza and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT VIe-3

Shallow, steep soils that have thin and discontinuous subsoils that overlie weathered mica schist

This capability unit consists of shallow, somewhat excessively drained, strongly acid soils that are slightly to moderately eroded. The soils are on narrow ridgetops or on the sharp breaks of slopes. They have steep slopes of 15 to 25 percent.

The surface layer, to a depth of 4 to 7 inches, is brown, very friable fine sandy loam. The subsoil is thin and consists of red, friable sandy clay loam to silty clay loam. It is moderately rapid in permeability. Plant roots can penetrate effectively to a depth of 12 to 15 inches. In most places mica schist or other hard or unweathered rocks are at a depth of more than 8 feet.

These soils have rapid surface runoff and a moderately rapid rate of infiltration. They are low in moisture-supplying capacity. Organic matter is low in the eroded soil and medium in the other soil. Both soils are low in available plant nutrients. They have a few gravelly and stony areas.

The soils of this unit are:

Louisa fine sandy loam, 15 to 25 percent slopes.
Louisa fine sandy loam, 15 to 25 percent slopes, eroded.

These soils generally are better suited to trees and pasture than to cultivated crops. They are moderately well suited to bermudagrass, ryegrass, rescuegrass, bahiagrass, annual lespedeza, crimson clover, sericea lespedeza, and kudzu. They are suited to shortleaf and loblolly pines. About 98 percent of the acreage is in trees.

In establishing pastures all tillage and planting need to be done on the contour. To prevent erosion, keep a large amount of organic matter on the surface while the

pastures are becoming established. Grazing needs to be controlled to prevent damage to the plant cover. To maintain moderate yields, the soils need lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting.

These soils are moderately well suited to bicolor lespedeza and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT VIe-4

Shallow, strongly sloping soil that has a thin and discontinuous, clayey subsoil and moderate erosion.

Only one soil—Musella clay loam, 10 to 15 percent slopes, eroded—is in this capability unit. This soil is shallow, well drained to somewhat excessively drained, strongly acid, and eroded. It is on broken interstream divides and has slopes ranging from 10 to 15 percent.

The surface layer, to a depth of 4 to 5 inches, is dark reddish-brown, friable clay loam. The subsoil is dark-red sandy clay loam to clay and is thin, firm to very firm, and moderately permeable. Because the soil is shallow over bedrock, plant roots can penetrate effectively only to a depth of about 12 inches.

This soil has rapid surface runoff and a slow rate of infiltration. Its moisture-supplying capacity is low. The soil is also low in organic matter and available plant nutrients. It has fair tilth. Crops grown on it make fair response to fertilizer. A few of the areas are stony or gravelly.

In general, this soil is better suited to trees or pasture than to cultivated crops. It is moderately well suited to bermudagrass, ryegrass, dallisgrass, rescuegrass, bahiagrass, annual lespedeza, white clover, crimson clover, and sericea lespedeza. It is suited to shortleaf and loblolly pines.

In establishing pastures, tillage and planting need to be done on the contour. To prevent erosion, keep a large amount of organic matter on the surface while the pastures are becoming established. Control grazing so that damage to the plant cover is prevented. To maintain moderate yields, the soil needs lime occasionally and a complete fertilizer regularly. Legumes need nitrogen only at the time of planting.

This soil is moderately well suited to bicolor lespedeza and similar crops that provide food and cover for wildlife.

CAPABILITY UNIT VIIe-1

Strongly sloping, severely eroded soils

Moderately deep, well-drained to somewhat excessively drained, strongly acid, eroded soils are in this capability unit. The soils are on interstream divides. They have slopes that range from 10 to 25 percent.

The surface layer, to a depth of about 4 inches, is red, friable gravelly sandy clay loam. The subsoil is red clay that is friable to firm and moderately permeable. Plant roots can penetrate effectively to a depth of 18 to 22 inches. Mica schist or other hard or unweathered rock commonly is at a depth of more than 8 feet.

These soils have very rapid surface runoff and a slow rate of infiltration. They are very low in moisture-supplying capacity and are low in organic matter and available plant nutrients. The soils have poor tilth. Crops

Figure 12.—**Poor-quality fescue and ladino clover pasture on Madison gravelly sandy clay loam, 10 to 15 percent slopes, very severely eroded. This soil is better suited to pine trees than to pasture or cultivated crops.**

grown on them make poor response to fertilizer. Quartz gravel covers about 20 to 30 percent of the soil surface, and there are a few stony areas.

The soils of this unit are:

- Madison gravelly sandy clay loam, 10 to 15 percent slopes, very severely eroded.
- Madison gravelly sandy clay loam, 15 to 25 percent slopes, severely eroded.
- Madison gravelly sandy clay loam, 15 to 25 percent slopes, very severely eroded.

These soils are better suited to shortleaf and loblolly pines than to cultivated crops (fig. 12). They are moderately well suited to bicolor lespedeza and similar crops that provide food and cover for wildlife. Logging roads and firebreaks should be run on the contour, and all forestry operations need to be done on the contour to reduce the risk of erosion. About 92 percent of this acreage is in trees, 7 percent is pastured, and the rest is idle.

CAPABILITY UNIT VIIe-2

Shallow, dominantly stony soils that have thin and discontinuous subsoils

This capability unit consists of shallow, well-drained to somewhat excessively drained, strongly acid soils that are slightly to moderately eroded. The soils are on broken interstream divides. They have slopes of 10 to 40 percent.

The surface layer is brown, very friable sandy loam to dark reddish-brown, friable clay loam. The subsoil is thin and consists of red to yellowish-brown sandy clay loam or clay that is moderately permeable. Plant roots can penetrate effectively to a depth of 8 to 12 inches. Mica schist, granite, or other hard or unweathered igneous or metamorphic rocks commonly are at a depth of 8 to 24 inches.

These soils have rapid to very rapid surface runoff and a slow rate of infiltration. Their moisture-supplying capacity is low. The soils are also low in organic matter and in available plant nutrients. They have poor tilth, and crops grown on them respond poorly to fertilizer.

There are many stony and gravelly areas.

The soils of this unit are:

Louisa fine sandy loam, 25 to 40 percent slopes.
Louisburg stony complex, 10 to 40 percent slopes.
Musella clay loam, 15 to 25 percent slopes, eroded.
Musella stony clay loam, 10 to 15 percent slopes, eroded.
Musella stony clay loam, 15 to 25 percent slopes, eroded.
Wilkes stony sandy loam, 10 to 15 percent slopes, eroded.

These soils are better suited to shortleaf and loblolly pines than to cultivated crops. They are moderately well suited to bicolor lespedeza and similar crops that provide food and cover for wildlife. Logging roads and firebreaks should be run on the contour, and other forestry operations ought to be done on the contour to reduce the risk of erosion. About 87 percent of the acreage is in trees, 4 percent is cropped, 3 percent is pastured, and the rest is idle.

CAPABILITY UNIT VIIIs-1

Miscellaneous land types

Miscellaneous land types made up of areas that are very shallow, excessively drained, and strongly acid, and areas that are gullied in places are in this capability unit. The soils are on broken interstream divides. They have slopes of 6 to 40 percent. In many places bedrock is at the surface. In other places it is at a depth of 18 to 20 inches.

These land types have very rapid surface runoff, and their permeability and rate of infiltration are very slow. They are very low in moisture-supplying capacity, in organic matter, and in available plant nutrients. Tilth is very poor, and crops grown on the soils make poor response to fertilizer.

The soils of this unit are:

Gullied land.
Rock outcrop.

Generally, plants in areas of Rock outcrop and Gullied land cannot make continuous growth. The areas can be managed to provide a small amount of food and cover for wildlife. They may be managed so that watersheds below them will be protected. They can also be developed as recreational areas.

Estimated Yields

Table 10 gives estimates of yields that can be expected for the principal soils of the county under defined management practices. Yields are given for each soil under two levels of management. In columns A are yields to be expected under management commonly practiced in the county. In columns B are yields obtained by farmers who used improved management practices or yields obtained by research workers. The figures are based on records of yields on individual farms; on yields obtained when long-term experiments were conducted; and on estimates made by agronomists who had had experience with the crops and with the soils.

Estimated yields have not been given for certain crops on some of the soils. Where dashes have been entered in the column instead of figures, expectable yields are considered to be too low for that particular crop on the soil indicated or management requirements are too exacting to warrant growing the crop.

The estimated yields are those obtained on soils that have not been irrigated. Adequate drainage and no hazard of overflow are assumed for soils listed as drained. Estimates of yields for soils subject to flooding do not reflect losses by flooding, because this hazard varies too greatly from place to place to justify estimating the amount of loss.

The level of management practiced to obtain yields in columns B is somewhat higher than that used in obtaining yields in columns A. Management practices consist of choosing carefully the kind of crop to be grown and the cropping system to be used, preparing a good seedbed, using proper methods of planting and seeding, inoculating legumes, planting high-yielding varieties and hybrids, seeding at recommended rates and at proper times, controlling weeds, controlling excess water through drainage, providing vegetated waterways, tilling on the contour or building terraces where needed, and adding liberal amounts of lime and fertilizer where required.

Specific management practices, by crops, that were used to obtain the estimated yields in table 10, follow:

Corn.—Management requirements for this crop vary among the different soils because the soils differ in general productivity and in moisture-supplying capacity.

Soils on which an estimated yield of 70 bushels per acre or more of corn is shown in table 10 have a treatment requirement of—

(1) 70 to 100 pounds of nitrogen and 60 to 70 pounds each of phosphoric acid (P_2O_5) and potash (K_2O).
(2) 10,000 to 15,000 plants per acre.
(3) Total crop residue or a winter cover crop returned to the soil.

Soils for which an estimated yield of 35 to 70 bushels per acre of corn was indicated in table 10 have a treatment requirement of—

(1) 32 to 70 pounds of nitrogen and 36 to 60 pounds each of phosphoric acid (P_2O_5) and potash (K_2O).
(2) 8,000 to 10,000 plants per acre.
(3) Total crop residue or a winter cover crop returned to the soil.

Soils for which an estimated yield of 15 to 35 bushels per acre of corn was indicated in table 10 have a treatment requirement of—

(1) 16 to 32 pounds of nitrogen and 16 to 36 pounds each of phosphoric acid (P_2O_5) and potash (K_2O).
(2) 5,000 to 8,000 plants per acre.

Cotton.—Management requirements for this crop vary among the different soils because the soils differ in general productivity and in moisture-supplying capacity.

Soils on which an estimated yield of 500 pounds of cotton (lint) per acre or more is shown in table 10 have a treatment requirement of—

(1) 60 to 96 pounds each of nitrogen and phosphoric acid (P_2O_5) and potash (K_2O).
(2) 24,000 to 30,000 plants per acre.
(3) Effective program for controlling insects.

Soils on which an estimated yield of 300 to 500 pounds of cotton (lint) per acre is shown in table 10 have a treatment requirement of—

(1) 36 to 60 pounds each of nitrogen, and phosphoric acid (P_2O_5), and potash (K_2O).
(2) 16,000 to 25,000 plants per acre.
(3) Effective program for controlling insects.

TABLE 10.—*Estimated yields* [1] *per acre of the principal crops under two levels of management*

[Yields in columns A are to be expected under common management practices; those in columns B are yields to be expected under improved management practices that do not include irrigation. Absence of figure indicates crop is not commonly grown]

Soil	Corn		Cotton (lint)		Oats		Wheat		Sericea lespedeza hay		Alfalfa hay	Bermudagrass and crimson clover pasture		Fescue and whiteclover pasture	
	A	B	A	B	A	B	A	B	A	B	B	A	B	A	B
	Bu.	*Bu.*	*lb.*	*lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]	*Cow-acre-days* [2]	*Cow-acre-days* [2]
Alluvial land:															
Moderately well drained	35	60		--	35	65	12	18	1.8	3.0	--	170	235	100	150
Somewhat poorly drained (drained)	32	55	--	--	--	--	--	--	--	--	--	135	195	100	150
Local alluvial land	42	75	400	575	38	70	15	24	2.0	3.3	--	175	240	100	150
Altavista fine sandy loam, 2 to 6 percent slopes, eroded	30	50	350	500	35	60	--	--	1.0	1.5	--	125	175	75	125
Appling sandy loam, 2 to 6 percent slopes, eroded	30	50	350	550	35	60	--	--	1.0	1.6	--	125	175	70	115
Appling sandy loam, 6 to 10 percent slopes, eroded	25	45	325	525	30	55	--	--	1.0	1.6	--	125	175	70	115
Appling sandy loam, 10 to 15 percent slopes, eroded	22	40	275	450	25	48	--	--	1.0	1.6	--	120	170	65	105
Appling sandy clay loam, 6 to 10 percent slopes, severely eroded	22	40	275	450	25	45	--	--	1.0	1.6	--	120	165	65	100
Appling sandy clay loam, 10 to 15 percent slopes, severely eroded	--	--	--	--	--	--	--	--	.8	1.3	--	100	140	60	90
Augusta silt loam (drained)	30	50	--	--	15	--	--	--	--	--	--	90	120	100	150
Buncombe loamy sands, 0 to 6 percent slopes	25	50	--	--	--	--	--	--	--	--	--	100	150	--	--
Chewacla soils (drained)	40	70	--	--	--	--	--	--	--	--	--	140	200	100	150
Colfax sandy loam, 2 to 6 percent slopes (drained)	15	25	--	--	--	--	--	--	--	--	--	70	110	80	120
Congaree soils	45	80	--	--	40	75	12	18	2.0	3.5	--	180	250	100	150
Davidson loam, 2 to 6 percent slopes, eroded	28	45	300	450	35	65	20	35	1.8	3.2	4.0	160	235	90	135
Davidson loam, 6 to 10 percent slopes, eroded	26	42	280	420	35	62	20	33	1.8	3.2	4.0	160	235	90	135
Davidson clay loam, 2 to 6 percent slopes, severely eroded	26	42	280	420	32	60	18	32	1.8	3.2	3.6	160	235	90	135
Davidson clay loam, 6 to 10 percent slopes, severely eroded	24	40	270	400	30	57	17	30	1.8	3.2	3.6	160	235	90	135
Davidson clay loam, 10 to 15 percent slopes, very severely eroded	--	--	--	--	--	--	--	--	1.0	1.4	--	120	160	65	95
Gullied land	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Helena sandy loam, 2 to 6 percent slopes, eroded	17	26	250	375	22	37	--	--	1.0	1.4	--	120	170	65	95
Helena sandy loam, 6 to 10 percent slopes, eroded	16	24	250	350	22	35	--	--	1.0	1.4	--	120	170	65	95
Helena soils, 6 to 10 percent slopes, severely eroded	15	22	225	315	20	32	--	--	.8	1.2	--	105	150	55	80
Lloyd sandy loam, 2 to 6 percent slopes, eroded	32	58	375	575	32	60	20	32	1.8	3.2	3.8	160	235	90	135
Lloyd sandy loam, 6 to 10 percent slopes, eroded	30	55	360	550	30	57	18	30	1.8	3.2	3.8	160	235	90	135
Lloyd sandy loam, 15 to 25 percent slopes, eroded	--	--	--	--	--	--	--	--	1.4	2.0	--	120	165	60	95
Lloyd clay loam, 2 to 6 percent slopes, severely eroded	26	42	280	420	32	60	18	32	1.8	3.2	3.6	155	225	85	125
Lloyd clay loam, 6 to 10 percent slopes, severely eroded	24	40	270	400	30	57	17	30	1.8	3.2	3.6	155	225	85	125
Lloyd clay loam, 6 to 10 percent slopes, very severely eroded	18	32	220	320	24	42	12	20	1.3	2.0	2.8	130	190	75	110
Lloyd clay loam, 10 to 15 percent slopes, severely eroded	20	35	240	350	26	48	15	24	1.6	2.5	3.2	140	205	80	115
Lloyd clay loam, 10 to 15 percent slopes, very severely eroded	--	--	--	--	--	--	--	--	1.0	1.6	--	120	170	70	105
Louisa fine sandy loam, 10 to 15 percent slopes	16	24	250	375	18	26	--	--	1.0	1.4	--	90	130	60	85
Louisa fine sandy loam, 15 to 25 percent slopes	--	--	--	--	--	--	--	--	1.0	1.2	--	90	130	60	85

See footnotes at end of table.

TABLE 10.—*Estimated yields [1] per acre of the principal crops under two levels of management*—Continued

Soil	Corn		Cotton (lint)		Oats		Wheat		Sericea lespedeza hay		Alfalfa hay	Bermuda-grass and crimson clover pasture		Fescue and whiteclover pasture	
	A	B	A	B	A	B	A	B	A	B	B	A	B	A	B
	Bu.	*Bu.*	*lb.*	*lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [2]	*Cow-acre-days* [2]	*Cow-acre-days* [2]	*Cow-acre-days* [2]
Louisa fine sandy loam, 25 to 40 percent slopes															
Louisa fine sandy loam, 10 to 15 percent slopes, eroded	16	24	250	375	18	26			1.0	1.4		90	130	60	85
Louisa fine sandy loam, 15 to 25 percent slopes, eroded									.9	1.2		90	130	60	85
Louisburg complex, 2 to 6 percent slopes, eroded	20	32	225	340	22	30			1.1	1.5		90	130	55	80
Louisburg complex, 6 to 10 percent slopes, eroded	16	26	210	315	20	28			1.0	1.4		90	130	50	72
Louisburg complex, 10 to 15 percent slopes, eroded	16	26	210	315	20	28			1.0	1.4		90	130	50	70
Louisburg stony complex, 10 to 40 percent slopes															
Madison gravelly fine sandy loam, 2 to 6 percent slopes, eroded	35	60	425	640	32	60	18	30	1.8	3.2	3.6	170	240	90	135
Madison gravelly fine sandy loam, 6 to 10 percent slopes	33	57	410	615	30	57	18	30	1.8	3.2	3.6	170	240	90	135
Madison gravelly fine sandy loam, 6 to 10 percent slopes, eroded	33	57	410	615	30	57	18	30	1.8	3.2	3.6	170	240	90	135
Madison gravelly fine sandy loam, 10 to 15 percent slopes	28	50	350	525	26	50	14	23	1.6	2.8	3.2	160	225	80	120
Madison gravelly fine sandy loam, 10 to 15 percent slopes, eroded	28	50	350	525	26	50	14	23	1.6	2.8	3.2	160	225	80	120
Madison gravelly fine sandy loam, 15 to 25 percent slopes									1.5	2.6		150	210	70	105
Madison gravelly fine sandy loam, 15 to 25 percent slopes, eroded									1.5	2.6		150	210	70	105
Madison gravelly sandy clay loam, 2 to 6 percent slopes, severely eroded	33	55	400	600	30	57	16	26	1.7	3.0	3.4	160	225	80	120
Madison gravelly sandy clay loam, 6 to 10 percent slopes, severely eroded	30	50	350	525	26	50	14	23	1.6	2.8	3.2	150	210	70	105
Madison gravelly sandy clay loam, 6 to 10 percent slopes, very severely eroded									1.0	1.6		120	170	65	90
Madison gravelly sandy clay loam, 10 to 15 percent slopes, severely eroded									1.3	2.0		125	180	65	90
Madison gravelly sandy clay loam, 10 to 15 percent slopes, very severely eroded															
Madison gravelly sandy clay loam, 15 to 25 percent slopes, severely eroded															
Madison gravelly sandy clay loam, 15 to 25 percent slopes, very severely eroded															
Mecklenburg sandy loam, 6 to 10 percent slopes, eroded	20	32	275	390	28	38	17	28	1.5	2.6		115	160	70	115
Molena loamy sand, 2 to 6 percent slopes	20	30	300	450	20	30			1.2	2.0		125	175		
Molena loamy sand, 6 to 10 percent slopes	18	26	275	400	18	26			1.2	2.0		125	175		
Musella clay loam, 6 to 10 percent slopes, eroded	15	22	250	375	20	33	12	20	1.4	2.1		115	160	60	82
Musella clay loam, 10 to 15 percent slopes, eroded									1.3	1.9		105	145	50	72
Musella clay loam, 15 to 25 percent slopes, eroded															
Musella stony clay loam, 6 to 10 percent slopes, eroded									1.4	2.1		115	160	60	82
Musella stony clay loam, 10 to 15 percent slopes, eroded															
Musella stony clay loam, 15 to 25 percent slopes, eroded															
Musella stony fine sandy loam, 15 to 25 percent slopes									1.4	2.1		115	160	60	82
Rock outcrop															

See footnotes at end of table.

TABLE 10.—*Estimated*[1] *yields per acre of the principal crops under two levels of management*—Continued

Soil	Corn		Cotton (lint)		Oats		Wheat		Sericea lespedeza hay		Alfalfa hay	Bermudagrass and crimson clover pasture		Fescue and whiteclover pasture	
	A	B	A	B	A	B	A	B	A	B	B	A	B	A	B
	Bu.	*Bu.*	*lb.*	*lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Cow-acre days*[2]	*Cow-acre days*[2]	*Cow-acre-days*[2]	*Cow-acre-days*[2]
State fine sandy loam, 0 to 6 percent slopes	42	75	400	600	40	75	18	30	2. 0	3. 5	------	180	250	100	150
Wehadkee silty clay loam	----	----	------	------	----	----	----	----	------	------	------	50	70	80	125
Wickham fine sandy loam, 2 to 6 percent slopes, eroded	35	60	400	600	32	60	18	30	1. 8	3. 2	3. 6	170	240	90	135
Wickham fine sandy loam, 6 to 10 percent slopes, eroded	33	57	380	570	30	57	17	28	1. 8	3. 2	3. 6	170	240	90	135
Wickham clay loam, 2 to 6 percent slopes, severely eroded	33	55	370	560	30	57	16	26	1. 7	3. 0	3. 4	160	225	80	120
Wickham clay loam, 6 to 10 percent slopes, severely eroded	30	50	350	525	26	50	14	23	1. 6	2. 8	3. 2	150	210	70	105
Wilkes sandy loam, 6 to 10 percent slopes, eroded	18	30	210	320	18	27	----	----	1. 2	1. 6	------	90	130	58	80
Wilkes stony sandy loam, 10 to 15 percent slopes, eroded	----	----	------	------	----	----	----	----	------	------	--		-- --	------	------

[1] Based in part on "Some Effects of Irrigation, Nitrogen and Plant Population on Corn," by F. C. Boswell, C. E. Anderson, and S. V. Stacey (*2*).

[2] The term cow-acre-days expresses the carrying capacity of pasture. As used here it is the product of the number of animal units carried per acre multiplied by the number of days during the year that animals can be grazed without injury to the pasture.

Soils on which an estimated yield of 150 to 300 pounds of cotton (lint) per acre is shown in table 10 have a treatment requirement of—

(1) 12 to 36 pounds of nitrogen and 16 to 36 pounds each of phosphoric acid (P_2O_5) and potash (K_2O).
(2) 12,000 to 18,000 plants per acre.
(3) Program for controlling insects.

Oats and wheat.—Soils on which an estimated yield of more than 50 bushels of oats per acre or a yield of more than 20 bushels of wheat per acre is shown in table 10 have a treatment requirement of—

(1) 16 to 24 pounds of nitrogen and 48 to 72 pounds each of phosphoric acid (P_2O_5) and potash (K_2O) applied at the time of planting.
(2) 32 to 64 pounds of nitrogen applied late in winter.

Soils on which an estimated yield of 30 to 50 bushels per acre of oats or of 12 to 20 bushels per acre of wheat is shown in table 10 have a treatment requirement of—

(1) 8 to 16 pounds of nitrogen and 24 to 48 pounds each of phosphoric acid (P_2O_5) and potash (K_2O) at the time of planting.
(2) 16 to 32 pounds of nitrogen applied late in winter.

Alfalfa.—Suggestions are for the most productive soils, and yields are given only in columns B, because only the most skilled farmers grow alfalfa. Soils for which yields are shown in table 10 have a treatment requirement of—

(1) 15 to 30 pounds of nitrogen, 20 pounds of borax, 96 to 120 pounds each of phosphoric acid (P_2O_5) and potash (K_2O), and 1 to 3 tons of lime applied at the time of seeding, depending upon the results of soil tests.
(2) Annual applications thereafter of 20 pounds of borax, 100 pounds of phosphoric acid (P_2O_5), and 200 pounds of potash (K_2O).
(3) One ton of lime added at least every 2 to 3 years.
(4) Proper mowing; refrain from mowing between September 15 and the date of the first frost.

Sericea lespedeza.—Soils on which an estimated yield of 2 tons or more of sericea lespedeza hay per acre is shown in table 10 have a treatment requirement of—

(1) 8 to 12 pounds nitrogen, 24 to 36 pounds each of phosphoric acid (P_2O_5) and potash (K_2O), and 1 ton of lime applied at the time of seeding.
(2) 48 to 72 pounds each of phosphoric acid (P_2O_5) and potash (K_2O) applied annually thereafter.
(3) One ton of lime applied at least 1 year out of every 3, or as needed, according to soil tests.

Soils on which the estimated yield is 1 to 2 tons per acre of sericea lespedeza for hay have a treatment requirement of—

(1) 8 to 12 pounds of nitrogen, 24 to 36 pounds each of phosphoric acid (P_2O_5) and potash (K_2O), and 1 ton of lime applied at the time of seeding.
(2) 24 to 48 pounds each of phosphoric acid (P_2O_5) and potash (K_2O) applied annually thereafter.
(3) One ton of lime applied at least 1 year out of every 3, or as needed, according to soil test.

Soils on which the estimated yield is less than 1 ton of sericea lespedeza for hay commonly receive little or no fertilizer or lime after planting.

Bermudagrass and crimson clover, fescue, and white clover.—Soils on which the estimated per acre yield shown in table 10 is 150 to 250 cow-acre-days for bermudagrass and crimson clover or 100 to 150 cow-acre-days for fescue and white clover have a treatment requirement of—

(1) 32 to 96 pounds of nitrogen, depending on the effectiveness of the clover in furnishing nitrogen to the grass.
(2) 48 to 96 pounds each of phosphoric acid (P_2O_5) and potash (K_2O).
(3) One ton of lime every 3 years, or as needed, according to soil test.
(4) Mowing to control excessive growth and weeds.

Soils having an estimated per acre yield of 90 to 150 cow-acre-days for bermudagrass and crimson clover or of

60 to 100 cow-acre-days for fescue and white clover have a treatment requirement of—

(1) 16 to 48 pounds of nitrogen and 24 to 48 pounds each of phosphoric acid (P_2O_5) and potash (K_2O).
(2) One ton of lime every 3 years, or as needed, according to soil test.
(3) Mowing to control excessive growth and weeds.

Soils on which the estimated per acre yield is less than 90 cow-acre-days for bermudagrass and crimson clover or 60 cow-acre-days for fescue and white clover commonly receive little fertilizer, lime, or other recommended treatment after planting.

Woodland Suitability Groupings

To assist owners of woodland in planning the use of their soils, the soils of Douglas County have been placed in eight woodland suitability groups, which are listed in table 11. Each group is made up of soils that have similar growth rates for trees and similar problems of

TABLE 11.—*Woodland suitability grouping of soils* [1]

Woodland group	Site index [2]		Seedling mortality	Plant competition	Equipment limitation	Erosion hazard	Windthrow hazard	Hazards from forest pests and diseases
	Loblolly pine	Shortleaf pine						
Group 1: Deep, well-drained, strongly acid upland soils that have a surface layer of sandy loam and a subsoil of red or yellow clay or sandy clay.	90	70	Slight	Slight	Slight	Slight	Slight	Slight.
Group 2: Deep, somewhat excessively drained to somewhat poorly drained, strongly acid soils, mainly on flood plains.	105	75	Slight	Moderate	Slight to moderate.	Slight	Slight	Slight.
Group 3: Shallow, somewhat excessively drained, strongly acid upland soils that have a surface layer of loamy sand and a thin, discontinuous subsoil.	70	60	Slight to moderate:	Slight	Slight to moderate.	Slight	Severe	Moderate.
Group 4: Deep or moderately deep, somewhat excessively drained to somewhat poorly drained, medium to strongly acid upland soils that have a loamy surface layer and a subsoil of red to mottled gray sandy loam to clay.	80	65	Slight	Slight	Slight	Slight to moderate.	Slight	Slight.
Group 5: Shallow, somewhat excessively drained, strongly acid upland soils that have a surface layer of fine sandy loam and a thin, discontinuous subsoil.	80	70	Slight	Slight to moderate.	Slight to moderate.	Slight	Moderate to severe.	Moderate.
Group 6: Shallow to moderately deep, well-drained to somewhat excessively drained, strongly acid upland soils that have a surface layer of clay loam and a red subsoil.	75	65	Moderate	Slight to moderate.	Slight to moderate.	Moderate	Slight	Moderate.
Group 7: Shallow, well-drained to somewhat excessively drained, strongly acid upland soils that have a surface layer of sandy loam and a thin, discontinuous subsoil.	60	50	Moderate	Slight to moderate.	Slight to moderate.	Slight to moderate.	Severe	Moderate.
Group 8: Moderately deep, well-drained to somewhat excessively drained, medium to strongly acid upland soils that have a surface layer of clay loam and a subsoil of red clay.	65	45	Moderate to severe.	Slight	Slight to moderate.	Severe	Moderate	Moderate.

[1] In this county the only soils not suited to trees are Gullied land, Rock outcrop, and Wehadkee silty clay loam.

[2] Site index is the average height of the dominant trees at 50 years of age. It indicates potential productivity.

woodland use and management. For each group, ratings are given according to the capabilities, the limitations, and the hazards on soils in woodland use. Site index ratings for loblolly and shortleaf pines are given for each group. By site index is meant the average height attained by the dominant trees in a 50-year-old stand. A site with an index of 70 feet for loblolly pine, for example, produces dominant trees of that species averaging 70 feet in height at the age of 50 years.

Seedling mortality refers to the expected degree of mortality of seedlings as influenced by kinds of soil. The ratings given in table 11 are: Slight—ordinarily, adequate natural regeneration will take place; moderate—natural regeneration cannot always be relied upon for adequate and immediate restocking; and severe—considerable replanting, special preparation of the seedbed, and use of superior planting techniques are required to assure adequate and immediate restocking.

Plant competition refers to the degree of competition and the rate that undesirable species invade different soils (brush encroachment) when openings are made in the canopy. The expected hazard of competition from other plants is rated as slight, moderate, or severe. A rating of slight means that competition from other plants is no special problem; of moderate, that plant competition develops but generally does not prevent an adequate stand of the designated species from becoming established; and of severe, that competition from other plants is so severe that natural restocking of the designated species cannot be relied on.

In ratings for equipment limitation—the soil characteristics that restrict or prohibit the use of equipment commonly used in tending and harvesting the trees—the terms slight, moderate, and severe are also used. By slight is meant there is no restriction in the kind of equipment used or in the time of year it is used; by moderate is meant there is a seasonal restriction of less than 3 months in using the equipment and that the equipment can be expected to damage the roots of trees to some extent; and by severe is meant that there is a seasonal restriction of more than 3 months in the use of equipment and that the equipment can be expected to cause severe damage to the roots of trees.

Erosion hazard refers to the potential erosion hazard of the soil when it is managed according to currently acceptable standards. The ratings are based on the increasing risk of erosion.

Windthrow hazard is an evaluation of soil characteristics that control tree-root development affecting windfirmness. The ratings are: Slight—no special problem is recognized, or individual trees would be expected to remain standing when released on all sides; moderate, root development of the designated species is adequate for stability, except during periods of excessive wetness or during periods of greatest wind velocity; and severe—depth of tree rooting does not give adequate stability, and individual trees would be blown over if released on all sides.

Hazards from forest pests and diseases are rated as slight, moderate, or severe. These ratings reflect the increasing seriousness of problems resulting from forest pests and diseases; that is, a rating of slight indicates that no special problem is recognized, of moderate, that a moderate problem is recognized, and of severe, that a serious problem is recognized.

The information on yields of shortleaf and loblolly pines given in table 12, together with the information about yields of pasture and tilled crops in table 10, will give the landowner a basis for estimating the expected return from woodland in comparison with returns he might expect in using the soils for pasture or crops.

Table 12 gives information about the average stand and the expected yields of well-stocked, unmanaged, naturally occurring stands of shortleaf and loblolly pines for soils with different site index ratings. Information in this table indicates that loblolly pine will grow faster and yield greater economic returns than shortleaf pine in all the woodland suitability groups in Douglas County.

Woodland group 1

This group consists of deep, well-drained, strongly acid soils of the uplands. The soils have a surface layer of sandy loam and a subsoil of red or yellow clay or sandy clay. They are moderately permeable and have

TABLE 12.—*Average stand and yield information for well-stocked, unmanaged, naturally occurring stands of shortleaf and loblolly pines*

[Statistics in this table are compiled from United States Department of Agriculture Miscellaneous Publication No. 50 (*9*)]

SHORTLEAF PINE

Site index	Age	Total volume per acre			Average height of dominant tree	Average diameter at breast height	Total trees per acre
	Years	*Cu. ft.*	*Cords*	*Bd. ft (Doyle)*	*Feet*	*Inches*	*Number*
50	20	--------	--------	--------	25	3. 2	1, 395
	30	2, 040	23	--------	35	4. 8	815
	40	2, 980	33	--------	44	6. 1	520
	50	3, 970	43	1, 600	50	7. 3	375
	60	4, 430	48	3, 200	55	8. 3	305
	70	4, 780	51	5, 050	59	9. 1	260
	80	5, 050	53	7, 000	62	9. 9	230
60	20	1, 060	12	--------	30	5. 8	1, 065
	30	2, 880	32	--------	42	5. 7	625
	40	4, 200	46	1, 550	52	7. 3	400
	50	5, 080	54	4, 350	60	8. 4	300
	60	5, 690	60	7, 600	66	9. 7	245
	70	6, 170	65	10, 250	71	10. 6	210
	80	6, 520	68	12, 700	74	11. 4	190
70	20	1, 600	18	--------	34	4. 5	850
	30	3, 720	41	750	49	6. 6	505
	40	5, 210	56	4, 000	61	8. 4	320
	50	6, 250	66	8, 650	70	9. 8	245
	60	7, 000	73	12, 600	77	11. 0	200
	70	7, 580	79	16, 250	82	12. 0	175
	80	8, 020.	83	19, 400	86	12. 8	160
80	20	2, 190	25	--------	39	5. 2	665
	30	4, 420	48	1, 950	56	7. 5	410
	40	6, 100	65	7, 650	70	9. 5	265
	50	7, 380	77	13, 550	80	11. 1	200
	60	8, 250	85	18, 850	88	12. 3	165
	70	8, 920	92	23, 450	94	13. 3	145
	80	9, 460	97	27, 550	99	14. 2	135

TABLE 12.—*Average stand and yield information for well-stocked, unmanaged, naturally occurring stands of shortleaf and loblolly pines*—Continued

Statistics in this table are compiled from United States Department of Agriculture Miscellaneous Publication No. 50 (*9*)]

LOBLOLLY PINE

Site index	Age	Total volume per acre			Average height of dominant tree	Average diameter at breast height	Total trees per acre
	Years	*Cu. ft.*	*Cords*	*Bd. ft. (Doyle)*	*Feet*	*Inches*	*Number*
60	20	1,100	12	--------	32	4.6	670
	30	2,150	25	--------	45	6.6	390
	40	3,000	35	1,000	54	8.1	290
	50	3,600	41	3,000	60	9.4	230
	60	3,950	46	5,000	64	10.4	200
	70	4,150	49	7,000	67	11.2	175
	80	4,350	51	8,500	69	11.9	160
70	20	1,450	17	--------	38	5.4	510
	30	2,700	31	1,000	52	7.8	315
	40	3,700	42	3,500	63	9.6	230
	50	4,350	50	6,500	70	10.9	180
	60	4,750	55	10,000	75	12.1	160
	70	5,050	59	12,500	78	13.0	140
	80	5,250	62	15,000	80	13.8	130
80	20	1,800	22	--------	43	6.2	430
	30	3,250	38	2,000	59	8.7	260
	40	4,400	51	6,000	72	10.7	195
	50	5,200	60	11,500	80	12.2	155
	60	5,700	66	16,000	85	13.6	130
	70	6,050	70	19,500	89	14.6	115
	80	6,250	73	22,000	92	15.5	105
90	20	2,250	27	--------	48	6.9	370
	30	3,850	46	4,000	67	9.6	225
	40	5,200	61	10,000	81	11.7	170
	50	6,150	71	16,500	90	13.6	135
	60	6,700	78	22,000	96	15.0	115
	70	7,100	82	26,000	100	16.2	100
	80	7,400	85	29,000	103	17.2	95
100	20	2,700	32	500	54	7.4	330
	30	4,550	53	6,000	74	10.4	205
	40	6,100	71	14,500	90	12.8	155
	50	7,200	84	23,000	100	14.7	125
	60	7,950	92	29,500	107	16.2	105
	70	8,400	96	33,000	112	17.6	95
	80	8,700	100	35,500	115	18.6	85
110	20	3,100	37	1,000	59	7.9	300
	30	5,300	62	9,000	81	11.2	190
	40	7,050	82	20,000	99	13.7	140
	50	8,400	96	29,500	110	15.7	115
	60	9,250	106	36,500	118	17.4	100
	70	9,750	112	40,500	122	18.8	90
	80	10,100	116	43,500	126	20.0	80

slopes ranging from 2 to 25 percent. The following soils are in this group:

Appling sandy loam, 2 to 6 percent slopes, eroded.
Appling sandy loam, 6 to 10 percent slopes, eroded.
Appling sandy loam, 10 to 15 percent slopes, eroded.
Lloyd sandy loam, 2 to 6 percent slopes, eroded.
Lloyd sandy loam, 6 to 10 percent slopes, eroded.
Lloyd sandy loam, 15 to 25 percent slopes, eroded.
Madison gravelly fine sandy loam, 2 to 6 percent slopes, eroded.
Madison gravelly fine sandy loam, 6 to 10 percent slopes.
Madison gravelly fine sandy loam, 6 to 10 percent slopes, eroded.
Madison gravelly fine sandy loam, 10 to 15 percent slopes.
Madison gravelly fine sandy loam, 10 to 15 percent slopes, eroded.
Madison gravelly fine sandy loam, 15 to 25 percent slopes.

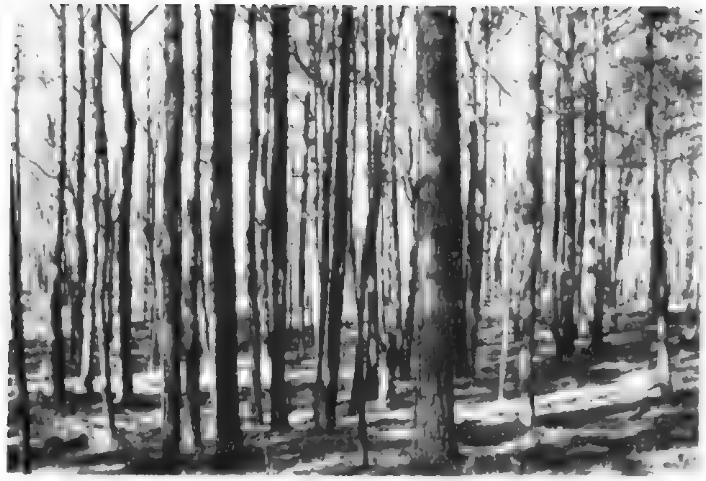

***Figure 13.*—Loblolly pine growing on Appling sandy loam, 6 to 10 percent slopes, eroded. The trees are ready for intermediate cutting. The volume per acre on this unmanaged 30-year-old stand is about 46 cords or 4,000 board feet (Doyle).**

Madison gravelly fine sandy loam, 15 to 25 percent slopes, eroded.
Wickham fine sandy loam, 2 to 6 percent slopes, eroded.
Wickham fine sandy loam, 6 to 10 percent slopes, eroded.

Loblolly pine (fig. 13) growing on these soils has a site index of 85 to 95, and shortleaf pine, a site index of 65 to 75. In making decisions about management, however, the average site index of 90 for loblolly pine and of 70 for shortleaf pine can be used for all the soils within the group (see table 12).

These soils have no special problems of seedling mortality. Ordinarily, the areas can be restocked satisfactorily by planting or by natural reseeding if a suitable source of seed is available.

Competition from other plants is slight. Hardwoods and other plants may invade, but growth of the desired species is so fast that this competition is soon crowded out.

Ordinary logging and pulpwood equipment can be used on these soils at all times, except immediately after heavy rains. The hazard of erosion is slight if a cover of plants is kept on the soils at all times. On soils that have slopes of more than 10 percent, there is a moderate hazard of erosion if the soils are clear cut or burned over.

Windthrow is not a serious hazard on these soils. Therefore, cutting and thinning can be done with little danger of future losses from windthrow.

No special diseases or insects or other pests are associated with trees growing on the soils of this group.

Woodland group 2

This group consists of deep, somewhat excessively drained to somewhat poorly drained, strongly acid soils. Except for the Colfax and State soils, all of the soils are on flood plains. The Colfax soils are commonly around the heads of drainageways, and the State soils, on low terraces.

The soils in this group range from brown to gray in color and have surface layers of loamy sand, sandy loam, or silt loam. They are moderately permeable. Their slopes range from 0 to 6 percent, but in most places the

slopes are less than 2 percent. The following soils are in this group:

Alluvial land, moderately well drained.
Alluvial land, somewhat poorly drained.
Augusta silt loam.
Buncombe loamy sands, 0 to 6 percent slopes.
Chewacla soils.
Colfax sandy loam, 2 to 6 percent slopes.
Congaree soils.
Local alluvial land.
State fine sandy loam, 0 to 6 percent slopes.

Loblolly pine growing on these soils has a site index of 100 to 110, and shortleaf pine, a site index of 70 to 80. In making decisions about management, however, the average site index of 105 for loblolly pine and of 75 for shortleaf pine should be used for all the soils within the group (see table 12). Except on the Buncombe soils, yellow-poplar has a high growth rate on all of these soils. Figure 14 shows yellow-poplar growing on the Chewacla soils.

These soils have no special problems of seedling mortality. Ordinarily, the areas can be restocked satisfactorily by planting or by natural reseeding if a suitable source of seed is available.

Competition from other plants is moderate. In the wetter areas hardwoods and other plants may invade, but, except in small areas, growth of the desired species is generally adequate. Competing vegetation may delay the natural regeneration of the stand or slow the early growth of the trees. Therefore, slight preparation of the site or other simple treatment may be desirable.

None of the soils of this group have more than a slight limitation in the use of logging or pulpwood equipment during the spring, summer, and fall, except immediately after heavy rains. Except on the Buncombe soils, limitations in the use of equipment are moderate in winter on all of the soils because the water table is generally high in winter. There is very little limitation in the use of equipment on the Buncombe soils.

The hazard of erosion is slight, as there is little surface runoff.

Figure 14.—**Yellow-poplar, ash, maple, and gum growing on areas of Chewacla soils. Poplar has a high growth rate and brings a good price, but competition from low-value trees slows its growth.**

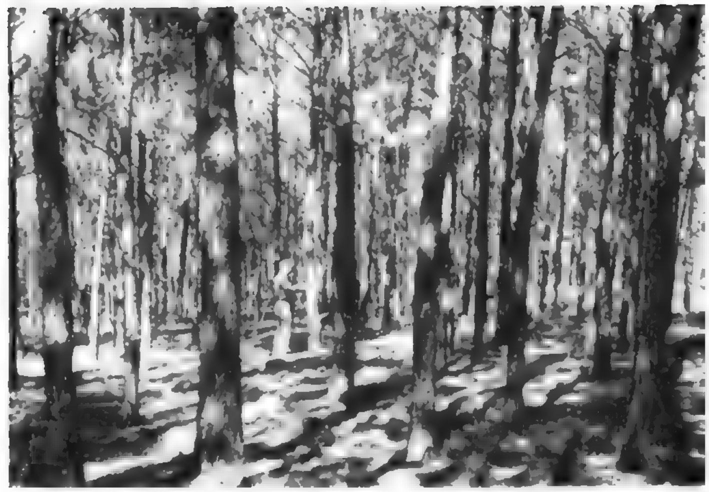

Figure 15.—**On soils of woodland group 3, loblolly pine grows well, averaging about 17 cords of wood in 20 years for well-stocked, unmanaged stands. The trees shown are ready for an intermediate cutting.**

Windthrow is not a serious hazard on these soils. Therefore, cutting and thinning can be done with little danger of future losses from windthrow.

Woodland group 3

This group consists of shallow, somewhat excessively drained, strongly acid soils of the uplands. The soils have a surface layer of loamy sand and a thin and discontinuous subsoil. They have formed primarily from granite. The soils are rapidly permeable and have slopes ranging from 2 to 40 percent. The following soils are in this group:

Louisburg complex, 2 to 6 percent slopes, eroded.
Louisburg complex, 6 to 10 percent slopes, eroded.
Louisburg complex, 10 to 15 percent slopes, eroded.
Louisburg stony complex, 10 to 40 percent slopes.

Loblolly pine (fig. 15) growing on these soils has a site index of 65 to 75, and shortleaf pine, a site index of 55 to 65. In making decisions about management, however, the average site index of 70 for loblolly pine and of 60 for shortleaf pine should be used for all soils within the group (see table 12).

Seedling mortality on these soils is a slight to moderate problem. On nonstony soils that have slopes of less than 25 percent, restocking can be accomplished satisfactorily by planting or by natural reseeding if a suitable source of seed is available. On slopes of more than 25 percent or on very stony areas, seedling mortality will be a moderate problem because of the low moisture-supplying capacity of the soils.

Competition from other plants is slight. Hardwoods and other plants may invade, but growth of the desired species commonly is faster than that of the competing vegetation and soon crowds it out.

Ordinary logging or pulpwood equipment can be used on most of these soils at practically all times. The movement of equipment is hindered, however, where the slopes are more than 25 percent or where the soil is very stony.

The hazard of erosion is slight if a cover of plants is kept on the soils at all times. On slopes of more than

10 percent, there is a moderate hazard of erosion if the soils are clear cut or burned over.

Windthrow is a severe problem because of the shallowness of the soils, which limits root development. Windthrow can be expected if the tree canopy is opened excessively in cutting or in thinning operations.

The hazard of damage by insects, pests, and diseases is moderate. Because of the low moisture-supplying capacity and because the soils are low in available plant nutrients, the trees become weak and are susceptible to damage after short periods of drought.

Woodland group 4

This group consists of deep or moderately deep, somewhat excessively drained to somewhat poorly drained, medium to strongly acid soils of the uplands. The soils have a loamy surface layer and a subsoil of red to mottled gray sandy loam to clay. They have rapid to moderately slow permeability and have slopes ranging from 2 to 15 percent. The following soils are in this group:

- Altavista fine sandy loam, 2 to 6 percent slopes, eroded.
- Appling sandy clay loam, 6 to 10 percent slopes, severely eroded.
- Appling sandy clay loam, 10 to 15 percent slopes, severely eroded.
- Davidson loam, 2 to 6 percent slopes, eroded.
- Davidson loam, 6 to 10 percent slopes, eroded.
- Davidson clay loam, 2 to 6 percent slopes, severely eroded.
- Davidson clay loam, 6 to 10 percent slopes, severely eroded.
- Helena sandy loam, 2 to 6 percent slopes, eroded.
- Helena sandy loam, 6 to 10 percent slopes, eroded.
- Helena soils, 6 to 10 percent slopes, severely eroded.
- Lloyd clay loam, 2 to 6 percent slopes, severely eroded.
- Lloyd clay loam, 6 to 10 percent slopes, severely eroded.
- Lloyd clay loam, 10 to 15 percent slopes, severely eroded.
- Madison gravelly sandy clay loam, 2 to 6 percent slopes, severely eroded.
- Madison gravelly sandy clay loam, 6 to 10 percent slopes, severely eroded.
- Mecklenburg sandy loam, 6 to 10 percent slopes, eroded.
- Molena loamy sand, 2 to 6 percent slopes.
- Molena loamy sand, 6 to 10 percent slopes.
- Wickham clay loam, 2 to 6 percent slopes, severely eroded.
- Wickham clay loam, 6 to 10 percent slopes, severely eroded.

Loblolly pine growing on these soils has a site index of 75 to 85, and shortleaf pine, a site index of 60 to 70. In making decisions about management, however, the average site index of 80 for loblolly pine and of 65 for shortleaf pine should be used for all the soils within the group (see table 12).

These soils have no special problems of seedling mortality. Ordinarily, the areas can be restocked satisfactorily by planting or by natural reseeding if a suitable source of seed is available.

Competition from other plants is slight. Hardwoods and other plants may invade, but growth of the desired species is so fast that the competing plants are soon crowded out.

Ordinary logging and pulpwood equipment can be used on these soils at all times, except immediately after heavy rains.

The hazard of erosion is slight to moderate. It is considered slight on all soils having less than 10 percent slopes and with slight or moderate erosion. On soils that have slopes of more than 10 percent or that are severely eroded, there is a moderate hazard of erosion. Care is necessary in locating and maintaining roads and trails on soils that have a moderate hazard of erosion.

Windthrow is not a serious hazard on these soils. Therefore, cutting and thinning can be done with little danger of future losses from windthrow.

No special hazards from forest diseases and insects or other pests are associated with trees growing on the soils of this group.

Woodland group 5

This group consists of shallow, somewhat excessively drained, strongly acid soils of the uplands. The soils have a surface layer of fine sandy loam and a thin and discontinuous subsoil. They have moderately rapid permeability and have slopes ranging from 2 to 15 percent. The following soils are in this group:

- Louisa fine sandy loam, 10 to 15 percent slopes.
- Louisa fine sandy loam, 15 to 25 percent slopes.
- Louisa fine sandy loam, 25 to 40 percent slopes.
- Louisa fine sandy loam, 10 to 15 percent slopes, eroded.
- Louisa fine sandy loam, 15 to 25 percent slopes, eroded.

Loblolly pine growing on these soils (fig. 16) has a site index of 75 to 85, and shortleaf pine, a site index of 65 to 75. In making decisions about management, however, the average site index of 80 for loblolly pine and of 70 for shortleaf pine should be used for all of the soils within the group (see table 12).

These soils have no special problems of seedling mortality. Ordinarily, the areas can be restocked satisfactorily by planting or by natural reseeding if a suitable source of seed is available.

Competition from other plants is slight to moderate. Hardwoods may invade the area and delay natural regeneration of the stand or slow the early growth of the trees. Slight preparation of the site and simple treatments to control the growth of hardwoods may be needed.

On soils in this group that have slopes of less than 25 percent, ordinarily logging and pulpwood equipment can be used at all times, except immediately after heavy rains. On soils that have slopes of more than 25 percent, there is a moderate hazard because the movement of equipment is restricted.

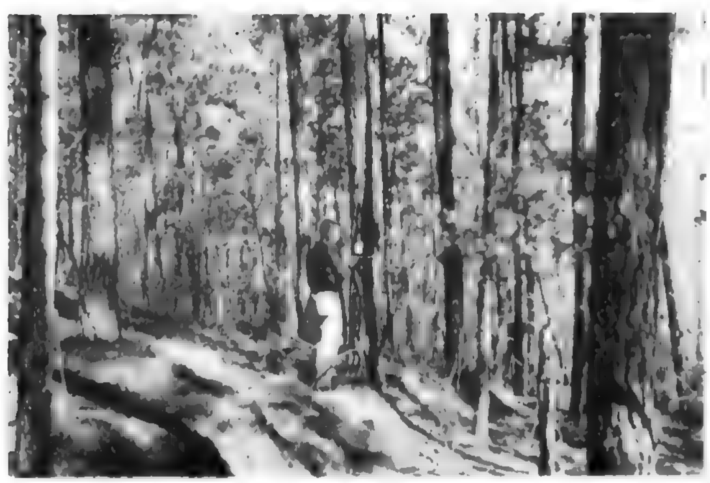

***Figure 16.*—Loblolly pine growing on Louisa fine sandy loam, 15 to 25 percent slopes, eroded. The forester is checking the size of the trees. These 41-year-old, unmanaged trees have a volume of about 51 cords, or 6,000 board feet per acre (Doyle).**

The hazard of erosion is slight as long as a cover of plants is kept on the soils at all times. If soils are clear cut or burned over, there is a serious hazard of erosion.

Windthrow is a moderate to severe problem because the shallow soils limit root development. If the tree canopy is opened excessively by cutting or thinning operations, windthrow can be expected.

The hazard of diseases and insects or other pests is moderate. Because the soils are low in moisture-supplying capacity and in available plant nutrients, the trees become susceptible to diseases and insects after short periods of drought.

Woodland group 6

This group consists of shallow to moderately deep, well-drained to somewhat excessively drained, strongly acid soils of the uplands. The soils have a surface layer of clay loam and a red subsoil. They have moderate permeability and have slopes ranging from 6 to 25 percent. The following soils are in this group:

- Madison gravelly sandy clay loam, 10 to 15 percent slopes, severely eroded.
- Madison gravelly sandy clay loam, 15 to 25 percent slopes, severely eroded.
- Musella clay loam, 6 to 10 percent slopes, eroded.
- Musella clay loam, 10 to 15 percent slopes, eroded.
- Musella clay loam, 15 to 25 percent slopes, eroded.
- Musella stony clay loam, 6 to 10 percent slopes, eroded.
- Musella stony clay loam, 10 to 15 percent slopes, eroded.
- Musella stony clay loam, 15 to 25 percent slopes, eroded.
- Musella stony fine sandy loam, 15 to 25 percent slopes.

Loblolly pine growing on these soils has a site index of 70 to 80, and shortleaf pine, a site index of 60 to 70. In making decisions about management, however, the average site index of 75 for loblolly pine and of 65 for shortleaf pine should be used for all soils within the group (see table 12).

These soils have a moderate problem of seedling mortality. The clay loam in the surface soil has a narrow range of moisture conditions under which seedlings will grow. Planted stands often require as much as 50 percent replanting. Natural reseeding commonly leaves many small areas understocked.

Competition from other plants is slight to moderate. Hardwoods may invade and delay the natural regeneration of the stand or slow the early growth of the trees. Slight preparation of the site and simple treatment for the control of hardwoods may be needed.

Limitations in the use of logging and pulpwood equipment are slight to moderate. In some areas deep gullies are a hazard. In most areas the movement of equipment is hindered after moderate or heavy rains because of the clayey texture of the soils.

The hazard of erosion is moderate on these soils. Care is necessary in locating and maintaining roads and trails. Practices to control erosion are needed on the slopes of cuts and fills. Roads and trails that have grades of 10 percent or more need protective measures.

Windthrow is not a serious hazard on these soils. Therefore, cutting and thinning can be done with little danger of future losses from windthrow.

The hazard of diseases and insects or other pests is moderate. The low moisture-supplying capacity of these soils causes the trees to be weak and susceptible to diseases and insects after short periods of drought.

Woodland group 7

This group consists of shallow, well-drained to somewhat excessively drained, strongly acid soils of the uplands. The soils have a surface layer of sandy loam and a thin and discontinuous subsoil. They vary in permeability. Their slopes range from 2 to 15 percent. The following soils are in this group:

- Wilkes sandy loam, 6 to 10 percent slopes, eroded.
- Wilkes stony sandy loam, 10 to 15 percent slopes, eroded.

Loblolly pine growing on these soils has a site index of 55 to 65, and shortleaf pine, a site index of 45 to 55. In making decisions about management, however, the average site index of 60 for loblolly pine and of 50 for shortleaf pine should be used for all soils within the group (see table 12).

Seedling mortality is a moderate problem on these soils. The variable texture of the soils and the low moisture-supplying capacity commonly result in seedling mortality of 40 to 50 percent of planted stands. Natural reseeding often leaves many small areas understocked, even where adequate seed trees are available.

Competition from other plants is slight to moderate. Hardwoods may invade and delay natural regeneration of the stand or slow the early growth of the trees. Slight preparation of the site and simple treatment for the control of hardwoods may be needed.

Limitations in the use of logging and pulpwood equipment are slight to moderate. Deep gullies or stones in some areas hinder the movement of equipment. In most areas movement of equipment is difficult after heavy rains.

The hazard of erosion is slight to moderate. Care is necessary in locating and maintaining roads and trails on soils that have more than 10 percent slopes.

Windthrow is a severe problem because of the shallowness of the soils, which limits root development. If the canopy of trees is opened excessively in cutting or thinning operations, windthrow can be expected.

The hazard of diseases and insects or other pests is moderate. The low moisture-supplying capacity and low available plant nutrients of these soils cause the trees to be weak and susceptible to diseases and insects after short periods of drought.

Woodland group 8

This group consists of moderately deep, well-drained to somewhat excessively drained, medium to strongly acid soils of the uplands. The soils have a surface layer of clay loam and a subsoil of red clay. They are very severely eroded, moderately permeable, and have slopes ranging from 6 to 25 percent. The following soils are in this group:

- Davidson clay loam, 10 to 15 percent slopes, very severely eroded.
- Lloyd clay loam, 6 to 10 percent slopes, very severely eroded.
- Lloyd clay loam, 10 to 15 percent slopes, very severely eroded.
- Madison gravelly sandy clay loam, 6 to 10 percent slopes, very severely eroded.
- Madison gravelly sandy clay loam, 10 to 15 percent slopes, very severely eroded.
- Madison gravelly sandy clay loam, 15 to 25 percent slopes, very severely eroded.

Loblolly pine growing on these soils has a site index of 60 to 70, and shortleaf pine, a site index of 40 to 50. In making decisions about management, however, the average site index of 65 for loblolly pine and of 45 for shortleaf pine should be used for all the soils within the group (see table 12).

Seedling mortality is moderate to severe on these soils. The surface soil of clay loam has a narrow range of moisture conditions under which seedlings will grow. The soils are low in moisture-supplying capacity, and the supply of available plant nutrients is low. These factors commonly result in a seedling mortality of 40 to 75 percent of the planted stands. Natural reseeding commonly leaves many areas understocked, even where adequate seed trees are available.

Competition from other plants is slight. Hardwoods and other plants may invade, but their growth is so slow that they have little effect on the desired vegetation.

Limitations on the use of logging and pulpwood equipment are slight to moderate. In most areas there are shallow and deep gullies that hinder the movement of equipment. Because of the clayey texture of the soils, movement of equipment is difficult in most areas after moderate to heavy rains.

The hazard of erosion is severe. Care is necessary in locating and maintaining roads and trails on all the soils of this group. Roads and trails with grades of 10 percent or more need protective measures. Measures to control erosion are needed on the slopes of all the cuts and fills.

Windthrow is a moderate problem because of the somewhat restricted root development in the soils. The areas are commonly on the upper parts of slopes near the crests of ridges. Windthrow can be expected if the tree canopy is opened excessively in cutting or thinning operations.

The hazard of insects, pests, and diseases is moderate. Because of the low moisture-supplying capacity, and because the soils are low in available plant nutrients, trees become weak and are susceptible to diseases and insects after short periods of drought.

Wildlife

Wildlife is a product of the soil, water, and plant resources of an area. The highest populations of fish, wild animals, and birds are generally in areas of good soils rather than in poor ones. Wildlife is often abundant, however, on wet soils and on certain other soils that normally are not suited to intensive use for agriculture. The Wehadkee soils, for example, are wet soils that are not suitable for intensive use for agriculture. Nevertheless, they are well suited to plants that tolerate water, such as Japanese millet and smartweed. After these plants have been grown, the soils can be flooded for duck shooting.

Most of the soils in the county are suitable for growing bicolor lespedeza, browntopmillet, field peas, Kobe lespedeza, sorghum, partridgepeas, trees that produce fruit or nuts, and other plants that provide food for wildlife. Louisburg stony complex, 10 to 40 percent slopes, Wilkes stony sandy loam, 10 to 15 percent slopes, eroded, and all of the very severely eroded soils, however, are only poorly suited or, at most, moderately well suited to some of these crops. The Wehadkee soils are also poorly suited to these crops.

Except for the Buncombe, Lloyd, Musella, Wilkes, Louisburg, and Davidson soils, which have rather high seepage characteristics, all of the soils of the county are suitable for ponds to be used by wildlife.

Engineering Uses of Soils

Soil engineering is well established in engineering practice today. It is, in a broad sense, a subdivision of structural engineering because it deals with the soil as the foundation material upon which structures rest or with the soil when used as a structural material. Soils, to the engineer, are natural materials that occur in great variety over the earth. Their engineering properties may vary widely from place to place, even within the relatively small confines of a single project.

Generally speaking, soil must be used in the locality and in the condition in which it is found. A large part of soil engineering practice consists of locating the various soils, determining their engineering properties, correlating those properties with the requirements of the job, and selecting the best possible material for each job.

This soil survey report contains information about the soils that will be helpful to engineers. Special emphasis has been placed on engineering properties as related to agriculture, especially on engineering properties that affect irrigation, farm ponds (fig. 17), structures to control and conserve soil and water, and similar items.

The information in this report will be of help in selecting and developing sites for industrial, business, residential, and recreational development; in selecting locations for highways, pipelines, and airports; in locating sand and gravel for use in construction; in correlating pavement performance with types of soil and thus developing information that will be useful in designing and maintaining the pavements; in determining the suitability of soil units for cross-country movements of vehicles and

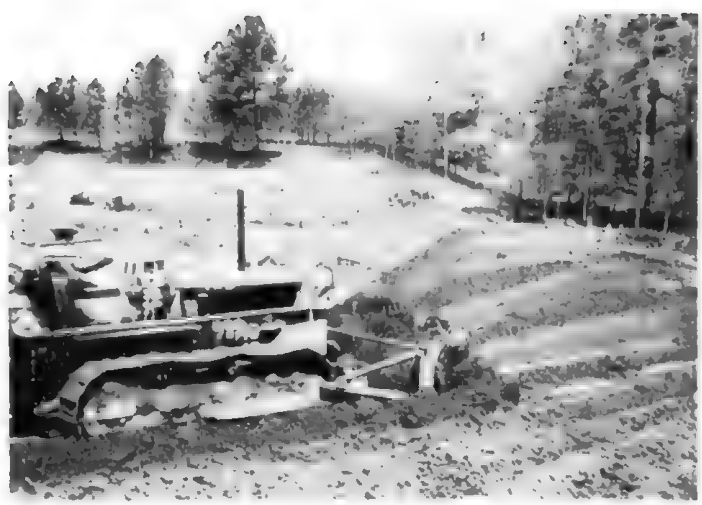

***Figure 17.*—Stockpiling clay from a Madison subsoil to be placed in a cutoff trench. The trench will be cut about 8 feet deep across the Chewacla soil in the bottom land. A clay core is needed to prevent water from seeping through the soil under the dam that will be built to the height of the ridge in center background.**

construction equipment; and in supplementing information obtained from other published maps and reports and aerial photographs for the purpose of making soil maps and reports that can be used readily by engineers.

Engineers of the Georgia State Highway Department, the United States Bureau of Public Roads, and the Soil Conservation Service collaborated with soil scientists of the Soil Conservation Service in preparing this section. It is intended to combine their knowledge of soils with information obtained through laboratory tests and field experience so that soil conditions can be interpreted appropriately for engineers in the county.

At many construction sites there are major variations in the soils within the depth of the proposed excavation, and the soils may differ greatly within short distances. The maps, soil descriptions, and other information in this report can best be used in planning for the detailed investigations necessary at the construction site. This would make possible the taking of only a minimum number of soil samples needed for laboratory testing. After the soils have been tested and their behavior, in place, has been observed under varying conditions, the engineer should be able to anticipate, to some extent, the properties of individual soil units wherever they are mapped.

The mapping and the description of soils in a soil survey report are somewhat generalized, however, and should be used only in planning more detailed field surveys to determine the in-place condition of the soil at the site of the proposed engineering construction.

In addition to information in this section, much additional information can be found in the text of the report. The engineer should refer briefly to the section, "How a Soil Survey is Made," and to the section, "Genesis, Morphology, and Classification of Soils." He will need also to refer to the section, "Descriptions of Soils," which gives descriptions of all the soils in the county.

Some of the terms used by the soil scientist may not be familiar to the engineer; other terms, though familiar, have special meanings in soil science. Most of the terms used in the tables and other special terms used in the report are defined in the Glossary.

The section contains five tables. Table 13 gives a brief description of the soils and their estimated physical properties; table 14 gives estimates of the suitability of the soils for highway construction and conservation engineering, and table 15 gives test data for the soils of seven extensive series in the county.

Tables 16 and 17, respectively, are provided for those not familiar with the soil properties considered in arriving at the AASHO and Unified classifications. In the second column of table 17, the symbols used in the Unified system are listed, and, in the last column, the equivalent symbols used in the AASHO classification. For the GW and GP groups, positive cutoff is needed for seepage control; in the GM and ML groups, a toe trench is needed in some areas and in other areas the soils have no such requirements; in the GC, SC, CL, OL, MH, CH, and OH groups, the soils have no requirements for seepage control; and in the SW, SP, and SM groups, upstream blanket and toe drainage or wells are required.

Engineering classification systems.—Most highway engineers classify soil materials in accordance with the system approved by the American Association of State Highway Officials. The principal characteristics according to which soils are classified in this system are shown in table 17. In this system soil materials are classified in seven principal groups. The groups range from A-1, consisting of gravelly soils of high bearing capacity, to A-7, consisting of clayey soils having low strengths when wet. Within each group, the relative engineering value of the soil material can be indicated by a group index number. Group indexes range from 0 for the best materials to 20 for the poorest. In this report group index numbers are assigned only for the soils on which tests have been performed.

Some engineers prefer to use the Unified Soil Classification system. The principal characteristics of the 15 classes of soil in this system are given in table 17. In the Unified system, soil materials are identified as coarse grained (8 classes), fine grained (6 classes), or highly organic. The Unified classification of all of the soils tested in the laboratory is given in table 15.

Engineering interpretations.—Although table 13 gives a brief description of the soils of the county, in general, it describes the soil material only to a depth of 5 feet or less. The physical properties were estimated. The estimates were based on field observations, on experience, and, to some extent, on laboratory tests. These estimates apply only to the soils of Douglas County.

Table 13 also gives estimates of the Unified classification of the soil material and estimates of the classification under the system used by the American Association of State Highway Officials. The information concerning grain size, permeability, structure, available water capacity, reaction, dispersion, and shrink-swell potential has been generalized from laboratory tests of some of the soils and estimated for the others.

In the column on depth to a seasonally high water table, the approximate distance is given from the soil surface to the free water in the soil during the wettest part of the year. Depth to bedrock refers to the approximate distance in feet from the soil surface to the hard or solid rock in the soil. The information in the column showing depth from surface (typical profile), is based on the descriptions of typical profiles given in the section, "Descriptions of Soils."

In the column on permeability, an estimate is given, in inches per hour, of the rate at which water percolates through undisturbed soil material. In the column on dispersion are given estimates of the characteristic of the soils to "slake" down into individual particles and thereby lose stability. The ratings in the column on shrink-swell potential indicate the volume change in each soil; that is, the shrinking of the soil when it dries and the swelling of the soil as it takes up moisture.

Table 14 gives estimates of the suitability of the soils for highway construction and for conservation engineering. It also rates the soils according to their suitability as drainage fields for septic tanks. The data are based on estimates and on interpretations of estimates given in table 13, on actual test data in table 15, and on actual field experience and performance. Each soil is given a rating of *good*, *fair*, or *poor* according to its suitability for various types of construction. If the rating is *fair* or *poor*, the hazard, or adverse factor, is described.

TABLE 13.—*Brief description of soils and estimated*

Symbol on map	Soil name	Depth to seasonally high water table	Depth to bedrock	Brief site and soil description	Depth from surface (typical profile)	Classification: USDA texture	Classification: Unified
		Feet	*Feet*		*Inches*		
	Alluvial land:						
Alm	Moderately well drained.	0 to 2	10 or more.	Moderately well drained to somewhat poorly drained, mixed alluvial materials on first bottoms; soil materials are dominantly loamy sands and sandy loams.	0–36	Loamy sand to sandy loam.	SM
Alp	Somewhat poorly drained.						
Sne	Local alluvial land.						
AkB2	Altavista fine sandy loam, 2 to 6 percent slopes, eroded.	3	20 or more.	Moderately well drained soil on low stream terraces; the uppermost 6 to 10 inches of fine sandy loam overlies about 3 feet of mottled, friable silty clay loam or sandy clay loam; beneath this is highly weathered residuum.	0–8	Fine sandy loam.	SM, ML
					8–45	Silty clay loam.	CL
					45–55+	Sandy clay loam.	SC, CL
AmB2	Appling sandy loam, 2 to 6 percent slopes, eroded.	More than 15.	5 to 25	Well-drained soils on uplands; the uppermost 5 to 10 inches of sandy loam or sandy clay loam overlies 2 to 3 feet of red and yellow, mottled, friable to firm sandy clay; beneath this is weathered residuum from granite, gneiss, or mica schist, ranging in thickness from a few inches to many feet.	0–7	Sandy loam or sandy clay loam.	SM, SC
AmC2	Appling sandy loam, 6 to 10 percent slopes, eroded.				7–37	Sandy clay	ML–CL, MH.
AmD2	Appling sandy loam, 10 to 15 percent slopes, eroded.				37–61+	Sandy loam to sandy clay loam.	ML, SM
AnC3	Appling sandy clay loam, 6 to 10 percent slopes, severely eroded.						
AnD3	Appling sandy clay loam, 10 to 15 percent slopes, severely eroded.						
AsI	Augusta silt loam	1	15 or more.	Somewhat poorly drained soil on low stream terraces; the uppermost 8 to 12 inches of silt loam overlies about 2 feet of friable to firm sandy clay loam; beneath this is variable alluvium.	0–10	Silt loam	ML
					10–33	Sandy clay loam.	CL
					33–48+	Fine sandy loam.	SM–SC
Bfs	Buncombe loamy sands, 0 to 6 percent slopes.	8	20 or more.	Somewhat excessively drained soils on flood plains along the larger streams; the texture is loamy sand to a depth of more than 4 feet.	0–48	Loamy sands	SM
Cfs	Chewacla soils	0 to 2	10 or more.	Somewhat poorly drained soils on first bottoms; the uppermost 6 to 12 inches of brown, friable silt loam overlies 2 to 3 feet of grayish-brown, mottled silt loam or fine sandy loam; beneath this is variable alluvium.	0–6	Silt loam	ML
					6–36	Silt loam to fine sandy loam.	ML, SM
CiB	Colfax sandy loam, 2 to 6 percent slopes.	1 to 1½	10 or more.	Somewhat poorly drained soil around heads of drainageways; the uppermost 7 to 10 inches of sandy loam overlies about 2 feet of sticky sandy clay; beneath this is weathered residuum from granite.	0–9	Sandy loam	SM
					9–32	Sandy clay	CL, CH
					32–45+	Sandy loam	ML, SC, SM.
Cng	Congaree soils	2½ to 3	10 or more.	Well-drained soils on first bottoms along the larger streams; the uppermost 3 feet of brown, friable silt loam or very friable fine sandy loam overlies variable alluvium.	0–35	Silt loam	ML

See footnote at end of table.

physical properties significant to engineering [1]

Classification—Continued	Grain size			Perme-ability	Structure	Available water capacity	Reaction	Dispersion	Shrink-swell potential
AASHO	Passing No. 200 sieve (0.074 mm.)	Passing No. 10 sieve (2.0 mm.)	Passing No. 4 sieve (4.7 mm.)						
	Percent	*Percent*	*Percent*	*Inches per hour*		*Inches per foot*	*pH*		
A–2	25–50	95–100	95–100	5. 0–10. 0	Single grain to granular.	1. 7	5. 1–5. 5	Low	Low.
A–2 or A–4	30–50	95–100	95–100	5. 0–10. 0	Granular	1. 4	5. 1–5. 5	Low	Low.
A–7	55–75	95–100	95–100	0. 2–0. 8	Subangular blocky.	1. 5	5. 1–5. 5	High to moderate.	Moderate.
A–7	40–60	95–100	95–100	0. 8–5. 0	Subangular blocky.	1. 2	5. 1–5. 5	Moderate	Low to moderate.
A–2, A–4	25–45	90–100	90–100	5. 0–10	Granular	1. 4	5. 1–5. 5	Low	Low.
A–7	60–75	95–100	95–100	0. 2–2. 5	Subangular blocky.	1. 5	5. 1–5. 5	High to moderate.	Moderate to high.
A–4, A–7	45–55	95–100	95–100	2. 5–10. 0	Massive to sub-angular blocky.	1. 6	5. 1–5. 5	Moderate	Low to moderate.
A–4	55–80	95–100	95–100	2. 5–5. 0	Granular	1. 5	5. 1–5. 5	Moderate	Low.
A–6	45–65	95–100	95–100	0. 2–0. 8	Subangular blocky.	1. 7	5. 1–5. 5	Moderate	Moderate.
A–2, A–4	30–55	95–100	95–100	0. 2–5. 0	Granular	1. 6	5. 1–5. 5	Low	Low.
A–2	20–35	95–100	100	2. 5–10. 0	Granular	. 8	5. 1–5. 5	Low	Low.
A–4	55–80	95–100	95–100	0. 8–2. 5	Granular	1. 5	5. 1–5. 5	Moderate	Low.
A–4	40–65	95–100	95–100	0. 8–2. 5	Granular	1. 7	5. 1–5. 5	Low to moderate.	Low.
A–2, A–4	20–40	90–100	95–100	2. 5–10. 0	Granular	1. 3	5. 1–5. 5	Low	Low.
A–7	55–75	95–100	95–100	0. 2–2. 5	Subangular blocky.	1. 5	4. 5–5. 0	Moderate	Moderate.
A–4, A–6	40–60	95–100	95–100	0. 8–5. 0	Subangular blocky.	1. 3	5. 1–5. 5	Moderate to low.	Low to moderate.
A–4	55–80	95–100	95–100	0. 8–5. 0	Granular	1. 9	5. 1–5. 5	Moderate	Low.

TABLE 13.—*Brief description of soils and estimated physical*

Symbol on map	Soil name	Depth to seasonally high water table	Depth to bedrock	Brief site and soil description	Depth from surface (typical profile)	Classification: USDA texture	Classification: Unified
		Feet	*Feet*		*Inches*		
DgB2	Davidson loam, 2 to 6 percent slopes, eroded.	More than 15.	10 or more.	Well-drained soils on uplands; the uppermost 5 to 10 inches of dark reddish-brown loam or clay loam overlies more than 3 feet of dark-red, friable to firm clay; beneath this is a thick layer of residuum from diorite and hornblende.	0–7	Loam or clay loam.	SM–SC, ML–CL.
DgC2	Davidson loam, 6 to 10 percent slopes, eroded.				7–50+	Clay	MH, CH
DhB3	Davidson clay loam, 2 to 6 percent slopes, severely eroded.						
DhC3	Davidson clay loam, 6 to 10 percent slopes, severely eroded.						
DhD4	Davidson clay loam, 10 to 15 percent slopes, very severely eroded.						
HYB2	Helena sandy loam, 2 to 6 percent slopes, eroded.	3	5 to 15	Moderately well drained to somewhat poorly drained soils on uplands; the uppermost 5 to 9 inches of sandy loam overlies 1 to 2½ feet of very firm to extremely firm clay; beneath this is a layer of weathered residuum from granite and gneiss.	0–6	Sandy loam	SM
HYC2	Helena sandy loam, 6 to 10 percent slopes, eroded.				6–23	Sandy clay to clay.	ML–CL, CL, MH–CH.
HYC3	Helena soils, 6 to 10 percent slopes, severely eroded.				23–80+	Sandy clay loam.	ML, MH, CL.
LdB2	Lloyd sandy loam, 2 to 6 percent slopes, eroded.	More than 15.	10 or more.	Well-drained soils on uplands; the uppermost 5 to 9 inches of sandy loam to sandy clay loam overlies 3 to 4 feet of dark-red, friable to firm clay; beneath this is a thick layer of residuum from diorite, hornblende schist, and mica schist.	0–6	Sandy loam or clay loam.	SM–SC
LdC2	Lloyd sandy loam, 6 to 10 percent slopes, eroded.				6–40	Clay	MH–CH, CL.
LdE2	Lloyd sandy loam, 15 to 25 percent slopes, eroded.				40–80+	Clay loam	SM, ML
LeB3	Lloyd clay loam, 2 to 6 percent slopes, severely eroded.						
LeC3	Lloyd clay loam, 6 to 10 percent slopes, severely eroded.						
LeC4	Lloyd clay loam, 6 to 10 percent slopes, very severely eroded.						
LeD3	Lloyd clay loam, 10 to 15 percent slopes, severely eroded.						
LeD4	Lloyd clay loam, 10 to 15 percent slopes, very severely eroded.						
LjE	Louisa fine sandy loam, 15 to 25 percent slopes.	More than 15.	15 or more.	Somewhat excessively drained soils on uplands; the uppermost 5 to 10 inches of fine sandy loam overlies ½ to 1 foot of friable sandy clay loam to silty clay loam; beneath this is a thick layer of sandy loam residuum from mica schist.	0–8	Fine sandy loam.	SC, SM, ML–CL.
LjD	Louisa fine sandy loam, 10 to 15 percent slopes.				8–16	Sandy clay loam to silty clay loam.	MH–CH
LjD2	Louisa fine sandy loam, 10 to 15 percent slopes, eroded.				16–40+	Sandy loam	ML–CL, SM, ML.
LjE2	Louisa fine sandy loam, 15 to 25 percent slopes, eroded.						
LjF	Louisa fine sandy loam, 25 to 40 percent slopes.						

See footnote at end of table.

properties significant to engineering [1]—Continued

Classification—Continued	Grain size			Permeability	Structure	Available water capacity	Reaction	Dispersion	Shrink-swell potential
AASHO	Passing No. 200 sieve (0.074 mm.)	Passing No. 10 sieve (2.0 mm.)	Passing No. 4 sieve (4.7 mm.)						
	Percent	*Percent*	*Percent*	*Inches per hour*		*Inches per foot*	*pH*		
A-4	35–55	85–95	95–100	2. 5–5. 0	Granular	1. 2	5. 6–6. 0	Moderate	Low to moderate.
A-7	60–80	95–100	95–100	0. 2 5. 0	Subangular blocky.	1. 2	5. 1–6. 0	Moderate to high.	Moderate to high.
A-2	25–30	95–100	95–100	2. 5–10. 0	Granular	1. 2	5. 1–5. 5	Low	Low.
A-7, A-6	50–70	95–100	95–100	0. 05– 0. 8	Angular to subangular blocky.	1. 4	5. 1 5. 5	High to moderate.	Moderate to high.
A-7, A-6	50–55	95–100	95–100	0. 2 - 2. 5	Massive	1. 4	4. 5 5. 5	Moderate	Moderate.
A-4	35–45	90–95	95–100	2. 5– 5. 0	Granular	1. 3	5. 1–5. 5	Moderate to low.	Low.
A-7	60–70	95–100	95–100	0. 2– 5. 0	Subangular blocky.	1. 3	4. 5–5. 5	Moderate to high.	Moderate to high.
A-7	40–70	95–100	95–100	2. 5–10. 0	Massive	1. 3	4. 5–5. 5	Low to moderate.	Moderate.
A 4, A 6	40–60	75–100	90 100	5. 0 10. 0	Granular	1. 6	5. 1–5. 5	Low	Low.
A-7	70–80	95–100	95–100	0. 8– 5. 0	Subangular blocky.	1. 5	5. 1–5. 5	Low to moderate.	Moderate.
A-4	40–70	85–100	95–100	2. 5–10. 0	Massive	1. 0	5. 1–5. 5	Low	Low to moderate.

TABLE 13.—*Brief description of soils and estimated physical*

Symbol on map	Soil name	Depth to seasonally high water table	Depth to bedrock	Brief site and soil description	Depth from surface (typical profile)	Classification	
						USDA texture	Unified
		Feet	*Feet*		*Inches*		
LlB2	Louisburg complex, 2 to 6 percent slopes, eroded.	More than 15.	1 to 4	Somewhat excessively drained soils on uplands; the uppermost 5 to 10 inches of loamy sand overlies ½ to 1½ feet of friable sandy clay loam to sandy loam; beneath this is granite; in Louisburg stony complex, 10 to 40 percent slopes, stones, boulders, and rock outcrops occupy as much as 20 percent of the surface.	0–7	Loamy sand	SM
					7–18	Sandy clay loam.	MH–CH
LlC2	Louisburg complex, 6 to 10 percent slopes, eroded.				18–27	Loamy coarse sand.	SM, SC
LlD2	Louisburg complex, 10 to 15 percent slopes, eroded.				27+	Bedrock	
LmE	Louisburg stony complex, 10 to 40 percent slopes.						
MhB2	Madison gravelly fine sandy loam, 2 to 6 percent slopes, eroded.	More than 15.	25 to 50	Well-drained soils on uplands; the uppermost 6 to 11 inches of gravelly fine sandy loam or gravelly sandy clay loam overlies 2 to 3 feet of friable to firm clay to clay loam; beneath this is a thick layer of highly weathered sandy loam residuum from mica schist.	0–11	Gravelly fine sandy loam or gravelly sandy clay loam.	SM, SM–SC.
MhC	Madison gravelly fine sandy loam, 6 to 10 percent slopes.				11–44	Clay to clay loam.	ML–CL, CL, MH.
MhC2	Madison gravelly fine sandy loam, 6 to 10 percent slopes, eroded.				44–72+	Sandy loam (loamy sand to sandy clay loam).	SM, SM–SC, ML.
MhD	Madison gravelly fine sandy loam, 10 to 15 percent slopes.						
MhD2	Madison gravelly fine sandy loam, 10 to 15 percent slopes, eroded.						
MhE	Madison gravelly fine sandy loam, 15 to 25 percent slopes.						
MhE2	Madison gravelly fine sandy loam, 15 to 25 percent slopes, eroded. ed.						
MiB3	Madison gravelly sandy clay loam, 2 to 6 percent slopes, severely eroded.						
MiC3	Madison gravelly sandy clay loam, 6 to 10 percent slopes, severely eroded.						
MiC4	Madison gravelly sandy clay loam, 6 to 10 percent slopes, very severely eroded.						
MiD3	Madison gravelly sandy clay loam, 10 to 15 percent slopes, severely eroded.						
MiD4	Madison gravelly sandy clay loam, 10 to 15 percent slopes, very severely eroded.						
MiE3	Madison gravelly sandy clay loam, 15 to 25 percent slopes, severely eroded.						

See footnote at end of table.

properties significant to engineering [1]—Continued

Classification—Continued	Grain size			Permeability	Structure	Available water capacity	Reaction	Dispersion	Shrink-swell potential
AASHO	Passing No. 200 sieve (0.074 mm.)	Passing No. 10 sieve (2.0 mm.)	Passing No. 4 sieve (4.7 mm.)						
	Percent	*Percent*	*Percent*	*Inches per hour*		*Inches per foot*	*pH*		
A-2, A-4	25-40	90-100	95-100	5. 0-10. 0	Weak, granular	1. 0	5. 1-5. 5	Low	Low.
A-7	55-65	95-100	95-100	2. 5- 5. 0	Subangular blocky.	1. 0	5. 1-5. 5	Moderate to low.	Moderate.
A-4, A-7	35-45	90-100	95-100	5. 0-10. 0	Massive to granular.	. 6	4. 5-5. 0	Low	Low to moderate.
A-2, A-4	25-50	90-100	95-100	2. 5-10. 0	Granular	1. 6	5. 1-5. 5	Low to moderate.	Low.
A-7, A-6	60-70	95-100	95-100	0. 8-2. 5	Subangular blocky.	1. 6	5. 1-5. 5	Moderate to high.	Moderate.
A-4, A-6, A-7	35-55	85-100	95-100	2. 5-10. 0	Massive to subangular blocky.	1. 2	4. 5-5. 5	Low	Low.

TABLE 13.—*Brief description of soils and estimated physical*

Symbol on map	Soil name	Depth to seasonally high water table	Depth to bedrock	Brief site and soil description	Depth from surface (typical profile)	Classification	
						USDA texture	Unified
		Feet	*Feet*		*Inches*		
MiE4	Madison gravelly sandy clay loam, 15 to 25 percent slopes, very severely eroded.						
MqC2	Mecklenburg sandy loam, 6 to 10 percent slopes, eroded.	More than 15.	5 to 15	Moderately well drained to well drained soils on uplands; the uppermost 8 to 12 inches of sandy loam overlies about 2 feet of firm or plastic clay; beneath this is a thick layer of residuum from diorite, gneiss, and mica schist.	0–10	Sandy loam	SM
					10–37	Clay	CH–MH
					37–52+	Sandy clay loam.	SC, CL
MtB	Molena loamy sand, 2 to 6 percent slopes.	More than 15	25 or more.	Somewhat excessively drained soils on high stream terraces; the surface soil of loamy sand gradually becomes finer textured with increasing depth, and in places sandy clay loam is at a depth between 36 and 54 inches; in some places, a few pebbles are in the surface layer and throughout the profile.	0–44	Loamy sand	SM
MtC	Molena loamy sand, 6 to 10 percent slopes.						
MvC2	Musella clay loam, 6 to 10 percent slopes, eroded.	More than 15.	1 to 4	Well-drained to somewhat excessively drained soils on uplands; the uppermost 5 to 10 inches of sandy clay loam overlies 6 to 12 inches of firm sandy clay loam to clay; beneath this is diorite that is weathered in places; in the stony Musella soils, stones, boulders, and rock outcrops occupy as much as 20 percent of the surface.	0–7	Stony fine sandy loam to clay loam.	SM–SC, ML, CL.
MvD2	Musella clay loam, 10 to 15 percent slopes, eroded.				7–18	Sandy clay loam to clay.	SC, MH–CH, MH
MvE2	Musella clay loam, 15 to 25 percent slopes, eroded.				18–40+	Sandy clay loam.	SC, ML
MwC2	Musella stony clay loam, 6 to 10 percent slopes, eroded.						
MwD2	Musella stony clay loam, 10 to 15 percent slopes, eroded.						
MwE2	Musella stony clay loam, 15 to 25 percent slopes, eroded.						
MFE	Musella stony fine sandy loam, 15 to 25 percent slopes.						
Sta	State fine sandy loam, 0 to 6 percent slopes.	3	15 or more.	Well-drained soil on very low stream terraces; the uppermost 10 to 12 inches of fine sandy loam overlies 2 to 3 feet of friable sandy clay loam; beneath this is mixed alluvium; in places beneath this soil are layers of sand and gravel.	0–12	Fine sandy loam.	SM
					12–45+	Sandy clay loam.	SC, CL
Weh	Wehadkee silty clay loam.	0	10 or more.	Poorly drained soil on first bottoms; gray silty clay loam to a depth of more than 3 feet; beneath this is mixed alluvium.	0–36	Silty clay loam.	CL–CH
WgB2	Wickham fine sandy loam, 2 to 6 percent slopes, eroded.	More than 15.	20 or more.	Well-drained soils on high stream terraces; the uppermost 5 to 10 inches of sandy loam to sandy clay loam overlies 2 to 4 feet of firm clay; beneath this soil, in many places, is a weakly cemented layer of water-rounded pebbles.	0–7	Fine sandy loam or clay loam.	SM, SM–SC.
WgC2	Wickham fine sandy loam, 6 to 10 percent slopes, eroded.				7–50	Sandy clay	CL, MH
					50+	Gravelly sand.	GM, SM
WhB3	Wickham clay loam, 2 to 6 percent slopes, severely eroded.						

See footnote at end of table.

properties significant to engineering [1]—Continued

Classification—Continued: AASHO	Grain size: Passing No. 200 sieve (0.074 mm.)	Grain size: Passing No. 10 sieve (2.0 mm.)	Grain size: Passing No. 4 sieve (4.7 mm.)	Permeability	Structure	Available water capacity	Reaction	Dispersion	Shrink-swell potential
	Percent	*Percent*	*Percent*	*Inches per hour*		*Inches per foot*	*pH*		
A-2, A-4	25-40	90-100	95-100	2. 5-10. 0	Granular	1. 3	5. 6-6. 0	Low	Low.
A-7	55-75	95-100	95-100	0. 2-0. 80	Subangular blocky.	1. 7	5. 1-5. 5	Moderate to high.	Moderate to high.
A-6	45-65	95-100	95-100	0. 2-5. 0	Massive	1. 2	5. 1-5. 5	Moderate	Low to moderate.
A-2	20-35	90-100	95-100	5. 0-10. 0	Granular	. 9	5. 1-5. 5	Low	Low.
A-4, A-6, A-7	45-65	85-95	90-100	0. 8-5. 0	Granular to subangular blocky.	1. 3	5. 1-6. 0	Low to moderate.	Low to moderate.
A-6, A-7	50-85	75-100	75-100	0. 2 5. 0	Subangular blocky.	1. 5	5. 1-5. 5	High to moderate.	Moderate.
A-5, A-6, A-7	45-65	90-100	95-100	2. 5-10. 0	Massive to subangular blocky.	1. 6	5. 1-5. 5	Moderate	Low to moderate.
A-2, A-4	30-50	95-100	100	2. 5 10. 0	Granular	1. 6	5. 1-5. 5	High	Low.
A-6	40-60	95-100	100	2. 5-5. 0	Subangular blocky to granular.	2. 0	4. 5-5. 0	Moderate	Low to moderate.
A-6, A-7	80-100	100	100	0. 05-0. 8	Massive	1. 4	4. 5-5. 0	Moderate to high.	Moderate to high.
A-2, A-4	30-50	85-95	95-100	2. 5-10. 0	Granular	1. 6	5. 1-5. 5	High	Low.
A-7	55-75	90-100	95-100	0. 8-2. 5	Subangular blocky.	1. 6	5. 1-5. 5	Moderate	Moderate.
A-1 to A-4	20-40	50-70	65-90	5. 0-10. 0	Massive	. 6	4. 5-5. 0	Moderate	Low.

TABLE 13.—*Brief description of soils and estimated physica*

Symbol on map	Soil name	Depth to seasonally high water table	Depth to bedrock	Brief site and soil description	Depth from surface (typical profile)	Classification	
						USDA texture	United
WhC3	Wickham clay loam, 6 to 10 percent slopes, severely eroded.						
WiC2	Wilkes sandy loam, 6 to 10 percent slopes, eroded.	*Feet* More than 10.	*Feet* 1 to 4	Well-drained to somewhat excessively drained upland soils; the uppermost 4 to 7 inches of sandy loam overlies 5 to 16 inches of very firm clay; beneath this is 6 to 24 inches of weathered schist, hornblende, and gneiss, and then hard rocks; in the stony Wilkes soil, stones, gravel, and boulders cover as much as 20 percent of the surface.	*Inches* 0–6	Sandy loam	SM, SC
WjD2	Wilkes stony sandy loam, 10 to 15 percent slopes, eroded.				6–14	Sandy clay loam to clay.	SC, MH, CH.
					14–24+	Silty clay	CL, CH

[1] Gullied land and Rock outcrop are not suited to engineering uses.

TABLE 14.—*Estimated suitability of the soils of Douglas*

Soil series	Suitability for wet-weather grading	Susceptibility to frost action	Suitability of soil material for—		Suitability as source of—		Suitability for—
			Road subgrade	Road fill	Topsoil	Sand and gravel	Vertical alinement of highways
							Cuts
Alluvial lands (Alm, Alp, Sne).	Poor; high water table.	Moderate	Good	Good	Good	Good	Not applicable
Altavista (AkB2)	Fair; moderately high water table.	Slight	Good[1]	Good	Good	Not suited	Fair; high ground water table and possible seepage in subsoil layer.
Appling (AmB2, AmC2, AmD2, AnC3, AnD3).	Fair; clayey subsoil.	Slight to moderate.	Good[1] in areas that are not severely eroded; fair to poor in severely eroded areas.	Good	Good in areas that are not severely eroded; poor in severely eroded areas.	Not suited	Fair; in places bedrock is at a depth of 5 feet or more.
Augusta (As1)	Poor; high water table.	Slight	Fair; poorly graded materials.	Good	Good	Not suited	Not applicable
Buncombe (Bfs)	Good	Slight	Good	Fair; gentle slopes needed; easily eroded.	Good	Fair; poorly graded sands.	Good

See footnote at end of table.

properties significant to engineering [1]—Continued

Classification—Continued: AASHO	Grain size: Passing No. 200 sieve (0.074 mm.)	Grain size: Passing No. 10 sieve (2.0 mm.)	Grain size: Passing No. 4 sieve (4.7 mm.)	Permeability	Structure	Available water capacity	Reaction	Dispersion	Shrink-swell potential
	Percent	*Percent*	*Percent*	*Inches per hour*		*Inches per foot*	*pH*		
A–2, A 4	20–50	70–85	80–95	2. 5–10. 0	Granular	. 6	5. 1–5. 5	Moderate to high.	Low.
A–6, A–7	45–75	75–90	80–100	0. 2–0. 8	Blocky	. 8	5. 1–5. 5	Moderate	Moderate.
A–6, A–7	55–65	85–95	90–100	0. 2–2. 5	Massive	. 4	4. 5–5. 5	Moderate to high.	Moderate.

County for use in various kinds of construction

Suitability for—Continued: Vertical alinement of highways—Con.: Fills	Farm ponds: Reservoir area	Farm ponds: Embankment	Agricultural drainage	Irrigation	Terraces and diversions	Waterways	Septic tank drainage fields
Good to poor; high water table.	Good	Good to poor; variable material.	Good	Good	Not needed	Not applicable	Not suited; high water table.
Good	Good	Good	Not needed	Good	Good	Good	Fair; high water table at times.
Good	Good	Good	Not needed	Good if slopes are less than 10 percent; poor on slopes of more than 10 percent; poor in severely eroded areas.	Good if slopes are less than 10 percent; fair if slopes are more than 10 percent.	Good to fair; difficult to keep vegetation on the stronger slopes and on severely eroded areas.	Fair to good.
Poor; high water table.	Good	Good	Good	Good	Terraces not needed; good for diversions.	Good	Poor; high water table.
Good	Poor; excessive seepage.	Fair to poor; rapidly permeable.	Not needed	Fair; low water-holding capacity.	Not needed	Not applicable	Good.

TABLE 14.—*Estimated suitability of the soils of Douglas*

Soil series	Suitability for wet-weather grading	Susceptibility to frost action	Suitability of soil material for— Road subgrade	Road fill	Suitability as source of— Topsoil	Sand and gravel	Suitability for— Vertical alinement of highways: Cuts
Chewacla (Cfs)	Poor; high water table.	Slight	Fair; poorly graded materials.	Good	Good	Poor; sand and gravel may be available at a depth of more than 3 feet.	Not applicable
Colfax (CiB)	Poor; high water table.	Slight	Fair; high water table; poor material below depths of 7 to 10 inches.	Good	Good	Not suited	Poor; high water table.
Congaree (Cng)	Poor; high water table.	Slight	Fair; poorly graded materials.	Good	Good	Poor; sand and gravel may be available at a depth of more than 3 feet.	Not applicable
Davidson (DgB2, DgC2, DhB3, DhC3, DhD4).	Poor; soil is clayey.	Moderate to severe.	Poor; poorly graded materials.	Fair; plastic, high swelling, clayey subsoil.	Poor; clayey texture.	Not suited	Good; in places bedrock is at a depth of 10 feet or more.
Helena (HYB2, HYC2, HYC3).	Fair; clayey subsoil.	Slight	Good; poor if severely eroded.	Good	Good	Not suited	Fair; in places bedrock is at a depth of 5 feet or more; possible seepage on clayey subsoil layer.
Lloyd (LdB2, LdC2, LdE2, LeB3, LeC3, LeC4, LeD3, LeD4).	Poor; soil is clayey.	Moderate	Poor; poorly graded materials.	Good	Fair; plastic; high swelling, clayey subsoil.	Not suited	Good; in places bedrock is at a depth of 10 feet or more.
Louisa (LjE, LjD, LjD2, LjE2, LjF).	Good	Slight	Good[1] to fair in areas where material consists mostly of weathered mica.	Good	Good	Not suited	Good; parent rock is commonly weathered to a depth of 15 feet or more.
Louisburg (LlB2, LlC2, LlD2, LmE).	Good	Slight	Good	Good	Good	Not suited	Poor; shallow depth to bedrock.

See footnote at end of table.

County for use in various kinds of construction—Continued

Suitability for—Continued							
Vertical alinement of highways—Con.	Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Waterways	Septic tank drainage fields
Fills	Reservoir area	Embankment					
Poor; high water table.	Good	Fair; poorly graded materials.	Good	Good	Not needed	Not applicable	Not suited; high water table.
Fair; requires drainage.	Good	Good	Fair; permeability of subsoil is moderately slow.	Fair; low-producing soil.	Not needed	Good	Not suited; high water table.
Poor; high water table.	Good	Fair; poorly graded materials.	Good	Good	Not needed	Not applicable	Poor; high water table.
Good	Poor; excessive seepage occurs if cuts are made into the subsoil.	Poor; high content of clay; poorly graded materials.	Not needed	Good to fair; slow rate of infiltration in clayey soils.	Good	Good	Good.
Good	Good	Good	Not needed	Fair; low-producing soil.	Good	Good	Not suited; moderately slow permeability.
Good	Poor; excessive seepage occurs if cuts are made into the subsoil.	Poor; high content of clay; poorly graded materials.	Not needed	Good to fair; slow rate of infiltration in clayey soils.	Good if slopes are less than 10 percent; fair to poor if slopes are more than 10 percent.	Good to poor; difficult to establish and maintain vegetation on stronger slopes and on severely eroded areas.	Good.
Good	Good	Good	Not needed	Poor; strong slopes.	Poor; strong slopes.	Poor; strong slopes.	Good.
Good	Fair; seepage may occur.	Good	Not needed	Poor; low water-holding capacity.	Good on slopes of less than 6 percent; fair to poor on others.	Good on slopes of less than 6 percent; difficult to establish and maintain vegetation on others.	Fair; bedrock in places.

TABLE 14.—*Estimated suitability of the soils of Douglas*

Soil series	Suitability for wet-weather grading	Susceptibility to frost action	Suitability of soil material for—		Suitability as source of—		Suitability for—
			Road subgrade	Road fill	Topsoil	Sand and gravel	Vertical alinement of highways
							Cuts
Madison (MhB2, MhC, MhC2, MhD, MhD2, MhE, MhE2, MiB3, MiC3, MiC4, MiD3, MiD4, MiE3, MiE4).	Fair; clayey subsoil.	Moderate	Good[1] in areas that are not severely eroded; poor in severely eroded areas.	Good	Good in areas that are not severely eroded to poor in severely eroded areas.	Not suited	Good
Mecklenburg (MqC2).	Fair; clayey subsoil.	Moderate	Good[1]	Fair; subsoil is a plastic, high swelling, clayey material.	Good	Not suited	Fair; in places bedrock is at a depth of 5 feet or more.
Molena (MtB, MtC).	Good	Slight	Good	Good	Good	Poor; too much silt and clay.	Good
Musella (MvC2, MvD2, MvE2, MwC2, MwD2, MwE2, MFE).	Poor; clayey soil	Moderate to severe.	Fair to poor; poorly graded materials.	Good	Poor; soil is clayey.	Not suited	Fair to poor; in places bedrock is at a depth of as little as 1 foot.
State (Sta)	Poor; moderately high water table.	Slight	Good	Good	Good	Fair to unsuited; underlain in many areas at a depth of 4 to 5 feet by sand and gravel.	Cuts should be avoided.
Wehadkee (Weh)	Poor; high water table.	Moderate	Poor; poorly graded materials.	Poor; poorly graded materials.	Poor; clayey soil.	Not suited	Not applicable
Wickham (WgB2, WgC2, WhB3, WhC3).	Fair; clayey subsoil.	Moderate	Good[1] to poor; severely eroded areas.	Good	Good	Fair to unsuited; underlain in many areas at a depth of 4 to 5 feet by sand and gravel.	Good
Wilkes (WiC2, WjD2).	Fair; variable soil material.	Moderate	Fair; variable materials.	Good	Poor; variable materials.	Not suited	Poor; in places bedrock is at a depth of as little as 1 foot.

[1] The uppermost 15 to 18 inches of this soil is the only part considered suitable as material for road subgrades.

Soil test data.—To help evaluate the soils for engineering purposes, samples, taken from 21 profiles of the principal soil types of each of 7 extensive soil series, were tested in accordance with standard procedures. The test data are given in table 15. The modal profile of a series is the most typical for the soil as it occurs in the county. Nonmodal profiles are samples of significant variations within the concept of the series or of the mapping unit. Each soil series was sampled in three localities, and the test data show some variation in physical test characteristics. Nevertheless, the data probably do not show the maximum variation in the horizons of each of the soil series. All of the samples were obtained at a depth of less than 7 feet. The test data, therefore, may not be adequate for estimating the characteristics of soil materials where deep cuts are required in rolling or hilly areas.

County for use in various kinds of construction—Continued

Suitability for—Continued								
Vertical alinement of highways—Con.	Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Waterways	Septic tank drainage fields
Fills	Reservoir area	Embankment					
Good	Good	Good	Not needed	Good on slopes of less than 10 percent if not severely eroded; poor on stronger slopes or on severely eroded areas.	Good on slopes of less than 10 percent; poor to fair in areas where slopes are more than 10 percent.	Good to poor; difficult to establish and maintain vegetation on the stronger slopes and severely eroded areas.	Good.
Good to poor.	Good if no cuts are made through the subsoil.	Good to fair; subsoil material poorly graded.	Not needed	Good	Good	Good	Poor; permeability of subsoil moderately slow.
Good	Poor; excessive seepage may occur.	Good	Not needed	Good to fair; low water-holding capacity.	Good	Good	Good.
Good	Poor; excessive seepage may occur through crevices in rocks or if cuts are made through the subsoil.	Poor; high content of clay; poorly graded materials.	Not needed	Poor; strong slopes; slow rate of infiltration.	Fair to poor; stony soil, strong slopes.	Poor; difficult to establish and maintain vegetation.	Very poor; in places bedrock is near the surface.
Fair; moderately high water table.	Good	Good	Good	Good	Not needed	Not applicable	Poor; moderately high water table.
Poor; high water table.	Good	Poor; poorly graded materials.	Poor; slow permeability.	Poor; low rate of infiltration.	Not needed	Not applicable	Not suited; high water table.
Good	Good	Good	Not needed	Good	Good	Good	Good.
Good	Poor; excessive seepage through crevices in the rocks.	Fair; variable materials.	Not needed	Poor; low water-holding capacity.	Poor; shallow, stony soil.	Poor; shallow, stony soil.	Not suited; in places bedrock is near the surface.

The AASHO and Unified (*1*, *11*) engineering soil classifications given in table 15 are based on data obtained by mechanical analyses and by tests made to determine liquid limits and plastic limits. Mechanical analyses were made by combined sieve and hydrometer methods. In the AASHO procedure, table 16, the fine material was analyzed by using the hydrometer method and the various grain-size fractions were calculated on the basis of all materials in the soil sample, including that coarser than 2 millimeters in diameter. The Soil Conservation Service uses the pipette method and excludes materials coarser than 2 millimeters in diameter from the calculations. Percentages of clay obtained by the hydrometer method are not used in naming textural classes of soils.

The tests for liquid limit and plastic limit measure the effect of water on the consistence of the soil material.

TABLE 15.—*Engineering test data [1] for soil samples taken from 21 soil profiles*

Soil type	Depth	Horizon	Moisture-density [2]: Maximum dry density	Moisture-density [2]: Optimum moisture content	Mechanical analyses [3]: Percentage passing sieve—No. 4 (4.7 mm.)	Percentage passing sieve—No. 10 (2.0 mm.)	Percentage passing sieve—No. 200 (0.074 mm.)	Percentage smaller than—(0.05 mm.)	Percentage smaller than—(0.002 mm.)	Liquid limit	Plasticity index	Classification: AASHO	Classification: Unified
	Inches		*Lb. per cu. ft.*	*Percent*									
Appling sandy loam:													
Modal profile	0–8	A_p	120	9	91	90	25	21	5	(4)	(4)	A–2–4(0)	SM.
	14–33	B_2	104	20	------	100	62	59	41	49	23	A–7–6(12)	ML–CL.
	43–72	C	107	18	------	100	52	47	19	38	10	A–4(3)	ML.
Grading toward Cecil soils.	8–18	A_2	127	10	------	100	43	40	19	22	9	A–4(2)	SC.
	21–39	B_2	98	24	------	100	75	73	52	60	24	A–7–5(18)	MH.
	45–75	C	105	19	------	100	52	47	26	44	14	A–7–5(5)	ML.
Grading toward Louisburg soils.	0–5	A_p	125	10	95	94	25	21	7	(4)	(4)	A–2–4(0)	SM.
	16–31	B_3	98	24	------	100	67	66	48	62	28	A–7–5(17)	MH.
	31–61	C	109	17	96	95	48	43	20	41	13	A–7–6(4)	SM.
Helena sandy loam:													
Modal profile	0–6	A_p	122	10	------	100	28	23	8	(4)	(4)	A–2–4(0)	SM.
	6–15	B_2	103	20	------	100	64	60	41	50	24	A–7–6(13)	ML–CL.
	23–80	C	100	21	------	100	51	46	25	51	19	A–7–5(7)	MH.
Light-textured soil	0–8	A_p	122	9	96	96	24	20	3	(4)	(4)	A–2–4(0)	SM.
	11–29	B_2	122	12	------	100	51	48	25	31	15	A–6(5)	CL.
	36–80	C	114	15	99	99	54	51	30	37	18	A–6(7)	CL.
Heavy-textured soil	0–6	A_p	121	11	------	100	29	25	9	20	3	A–2–4(0)	SM.
	6–23	B_2	99	22	------	100	69	67	47	62	32	A–7–5(18)	MH–CH.
	29–80	C	103	20	------	100	53	48	25	47	17	A–7–5(7)	ML.
Lloyd clay loam:													
Modal profile	0–5	A_p	130	10	96	93	36	33	15	17	3	A–4(0)	SM.
	9–32	B_2	110	17	99	97	63	61	44	43	21	A–7–6(10)	CL.
	64–80	C	100	24	------	100	69	67	42	50	16	A–7–5(11)	ML.
Light-textured soil	0–6	A_p	116	14	96	90	38	34	20	27	8	A–4(1)	SC.
	6–21	B_2	102	23	98	96	65	62	42	55	25	A–7–5(14)	MH–CH.
	33–60	C	102	21	------	100	56	52	22	45	11	A–7–5(5)	ML.
Heavy-textured soil	0–5	A_p	108	16	98	93	46	42	20	31	9	A–4(2)	SM–SC.
	5–22	B_2	100	23	------	100	69	66	48	54	26	A–7–6(16)	MH–CH.
	31–80	C	104	21	------	100	43	40	23	42	14	A–7–6(3)	SM.
Louisa fine sandy loam:													
Modal profile	2–8	A_2	114	15	92	77	45	40	12	34	17	A–6(4)	SC.
	8–27	C	116	15	98	89	51	46	20	32	8	A–4(3)	ML–CL.
Modal profile	0–6	A_p	106	17	92	80	42	38	8	40	6	A–4(1)	SM.
	6–26	C	118	14	97	85	41	37	11	30	3	A–4(1)	SM.
Grading toward Madison soils.	0–7	A_p	110	15	99	96	58	50	14	28	4	A–4(5)	ML–CL.
	7–18	B_{31}	102	21	------	100	74	69	36	51	22	A–7–6(15)	MH–CH.
	24–34	C	110	16	98	96	60	56	17	36	9	A–4(5)	ML.
Louisburg complex:													
Modal profile	0–7	A_p	125	10	------	100	37	33	9	18	3	A–4(0)	SM.
	13–30	B_3	102	20	------	100	62	59	39	58	27	A–7–5(15)	MH–CH.
	30–34	C	110	16	------	100	45	41	27	43	16	A–7–6(4)	SM–SC.
Grading toward Cecil soils.	0–7	A_p	124	10	98	91	30	26	6	20	2	A–2–4(0)	SM.
	15–28	B_3	104	19	------	100	58	56	39	59	29	A–7–5(14)	MH–CH.
	28–46	C	110	16	98	90	38	34	19	45	17	A–7–6(2)	SM.
Light-textured soils	0–6	A_p	115	12	------	100	28	23	7	(4)	(4)	A–2–4(0)	SM.
	13–23	C	116	13	------	100	27	23	7	(4)	(4)	A–2–4(0)	SM.
Madison gravelly fine sandy loam:													
Modal profile	0–6	A_p	118	12	97	95	32	27	9	(4)	(4)	A–2–4(0)	SM.
	8–32	B_2	103	21	------	100	63	60	45	47	21	A–7–6(11)	ML–CL.
	61–80	C	109	18	99	98	38	32	19	(4)	(4)	A–4(0)	SM.
Grading toward Louisa soils.	0–5	A_p	126	10	97	89	26	21	8	(4)	(4)	A–2–4(0)	SM.
	8–17	B_2	112	18	99	94	61	59	44	40	19	A–6(9)	CL.
	21–38	C	117	15	95	87	43	39	27	38	14	A–6(3)	SM–SC.
Light-textured soil	0–9	A_p	109	16	97	97	46	43	16	28	6	A–4(2)	SM–SC.
	22–44	B_2	102	23	------	100	66	64	42	53	22	A–7–5(13)	MH.
	44–72	C	104	20	------	100	55	52	27	43	13	A–7–5(6)	ML.

See footnotes at end of table.

TABLE 15.—*Engineering test data*[1] *for soil samples taken from 21 soil profiles*—Continued

Soil type	Depth	Horizon	Moisture-density[2]: Maximum dry density	Moisture-density[2]: Optimum moisture content	Mechanical analyses[3]: Percentage passing sieve—No. 4 (4.7 mm.)	Percentage passing sieve—No. 10 (2.0 mm.)	Percentage passing sieve—No. 200 (0.074 mm.	Percentage smaller than—(0.05 mm.)	Percentage smaller than—(0.002 mm.)	Liquid limit	Plasticity index	Classification: AASHO	Classification: Unified
Musella clay loam:	*Inches*		*Lb. per cu. ft.*	*Percent*									
Modal profile	0–6	A_p	124	13	92	88	48	41	16	23	5	A-4(3)	SM-SC.
	6–20	B_3	113	18	76	74	49	45	22	34	14	A-6(4)	SC.
Light-textured soil	0–4	A_p	113	16	97	93	54	50	30	33	15	A-6(6)	CL.
	4–17	B_3	100	21	97	91	59	55	34	53	24	A-7-6(12)	MH-CH.
	17–40	C	98	24	------	100	60	54	26	42	13	A-7-6(6)	ML.
Weathered C material	0–7	A_p	104	22	93	92	64	60	29	42	17	A-7-6(9)	ML-CL.
	9–20	B_3	92	29	------	100	83	79	43	64	28	A-7-5(19)	MH.
	20–57	C	92	29	------	100	62	56	17	47	8	A-5(5)	ML.

[1] Tests performed by the Bureau of Public Roads in accordance with standard procedures of the American Association of State Highway Officials (AASHO).

[2] Moisture-density according to AASHO Designation: T 99–57. Method A was used when the particles of the sample were retained on a No. 4 sieve, and method C was used for other samples.

[3] Mechanical analyses according to AASHO Designation: T 88–54. Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes of soils.

[4] Nonplastic.

As the moisture content of a clayey soil increases from very dry, the material changes from a solid to a semisolid or plastic state. As the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content, on a dry basis, at which the soil material passes from a semisolid to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic.

Table 15 also gives compaction (moisture-density) data for the tested soils. If a soil material is compacted at successively higher moisture content, assuming that the compactive effect remains constant, the density of the compacted material will increase until the optimum moisture content is reached. After that, the density decreases with increase in moisture content. The highest dry density obtained in the compaction test is termed "maximum dry density." Moisture-density data are important to earthwork, because, generally, optimum stability is obtained if the soil is compacted to about the maximum dry density when it is at approximately the optimum moisture content.

Genesis, Morphology, and Classification of Soils

Soil is the product of parent materials, topography, time, living organisms, and climate. The nature of the soil at any given place on the earth depends on the combination of these five major factors at that particular point. All five of these factors have had an effect on the genesis of every soil in Douglas County and on every soil throughout the world.

The relative importance of each factor differs from place to place; sometimes one factor has more effect on the formation of a soil and sometimes another. In extreme cases one factor may dominate in the formation of a soil and determine most of its properties, as is common when the parent material consists of pure quartz sand. Quartz sand is highly resistant to change, and soils formed in it commonly have faint horizons. Even in quartz sand, however, a distinct profile can be formed under certain types of vegetation where the topography is low and flat and there is a high water table. Thus, for every soil, the past combination of the five major factors is of first importance to its present character.

Genesis of Soils

The following discusses the five factors that affect soil formation, namely, parent materials, topography, time, living organisms, and climate.

Parent materials.—Parent materials are the unconsolidated mass from which soil develops. They are largely responsible for the chemical and mineralogical composition of soils. In Douglas County the parent materials of most of the soils are residual; that is, they have formed in place through the weathering of the parent rocks. The kinds of rocks from which the parent materials of each soil series were derived are listed in table 18.

TABLE 16.—*Classification of soils by*

General classification	Granular materials (35 percent or less passing No. 200 sieve)				
Group classification	A–1		A–3	A–2	
	A–1–a	A–1–b		A–2–4	A–2–5
Sieve analysis:					
Percent passing—					
No. 10	50 maximum.				
No. 40	30 maximum	50 maximum	51 minimum.		
No. 200	15 maximum	25 maximum	10 maximum	35 maximum	35 maximum
Characteristics of fraction passing No. 40 sieve:					
Liquid limit			NP.[2]	40 maximum	41 minimum
Plasticity index	6 maximum	6 maximum	NP.[2]	10 maximum	10 maximum
Group index	0	0	0	0	0
Usual types of significant constituent materials.	Stone, fragments, gravel, and sand.	Stone fragments, gravel, and sand.	Fine sand	Silty gravel and sand.	Silty gravel and sand.
General rating as subgrade	Excellent to good				

[1] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (pt. 1; ed. 7): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, AASHO Designation: M 145–49.

According to the Geologic Map of Georgia (*5*), biotite gneiss and schist underlie about 60 percent of the county. Soils of the Madison and Louisa series are the principal ones formed in materials derived from these two kinds of rocks. In about 15 percent of the county, Augen gneiss underlies the soils. Soils formed in materials derived from Augen gneiss are mostly of the Appling or Louisburg series. Hornblende gneiss underlies the soils in another 10 to 12 percent of the county. The Musella, Lloyd, and Davidson soils are the principal ones formed in materials derived from this kind of parent rock. A few soils have formed in materials weathered from granite-gneiss and from Ashland, Brevard, or muscovite schists. In about 500 acres there are outcrops of granite that is only slightly weathered.

About 12 percent of the county is occupied by soils formed in alluvium. These soils are mainly along the larger streams. Approximately 3 percent of this acreage consists of soils formed in old alluvium, and about 9 percent, of soils formed in young alluvium. Much of this alluvium originated from rocks in the nearby uplands, but some of it came from the granitic and metamorphic rocks of the mountains to the northeast. The soils on first bottoms show little profile development and are still receiving deposits. In contrast, the soils on the old, high terraces have been in place long enough for distinct horizons to have developed.

Topography.—Topography is largely determined by the kind of bedrock formations underlying the soils, by the geologic history of the area, and by the effects of dissection by streams. It influences soil formation through its effects on moisture relations, erosion, temperature, and plant cover.

The soils of Douglas County have slopes that range from 0 to about 40 percent. In upland areas soils that have slopes of less than 15 percent are generally deeper and have more distinct horizons than soils that have stronger slopes. In soils that have slopes of 15 to 40 percent, geologic erosion removes the soil material almost as fast as it forms. As a result, most of the soils that have stronger slopes—for example, soils of the Louisa and Musella series—have a thin solum.

The highest elevation in the county is at a point on a ridge west of Douglasville. At that point the elevation is more than 1,200 feet above sea level. The lowest elevation is on the Chattahoochee River at a point near the line between Douglas and Carroll Counties. At that point the elevation is about 700 feet above sea level, or more than 500 feet below the highest point.

The differences in elevation and the many branching drainageways contribute to the good drainage of most of Douglas County. Excess water moves into the channels rapidly and is removed with little delay.

Time.—The length of time required for a mature soil to develop depends largely on the other factors of soil formation. A normal, or mature, soil profile in Douglas County is one that has easily recognized zones of eluviation (A horizon) and illuviation (B horizon). Less time is generally required for a soil to develop in humid, warm areas that have rank vegetation than in dry or cold areas where the vegetation is scant. Also, less time is required if the parent material is coarse textured than if it is fine textured, other factors being equal.

The age of soils varies considerably. Generally speaking, the older soils show a greater degree of horizon differentiation than younger ones. For example, on the

American Association of State Highway Officials [1]

Granular materials (35 percent or less passing No. 200 sieve)—Continued		Silt-clay materials (more than 35 percent passing No. 200 sieve)				
A-2—Continued		A-4	A-5	A-6	A-7	
A-2-6	A-2-7				A-7-5	A-7-6
35 maximum	35 maximum	36 minimum	36 minimum	36 minimum	36 minimum	36 minimum.
40 maximum 11 minimum	41 minimum 11 minimum	40 maximum 10 maximum	41 minimum 10 maximum	40 maximum 11 minimum	41 minimum 11 minimum [3]	41 minimum. 11 minimum.[3]
4 maximum	4 maximum	8 maximum	12 maximum	16 maximum	20 maximum	20 maximum.
Clayey gravel and sand.	Clayey gravel and sand.	Nonplastic to moderately plastic silty soils.	Highly elastic silts.	Medium plastic clays.	Highly plastic clays.	Highly plastic clays.
Fair to poor						

[2] NP—Nonplastic.
[3] Plasticity index of A-7-5 subgroup is equal to or less than LL minus 30. Plasticity index of A-7-6 subgroup is greater than LL minus 30.

smoother parts of the uplands and on the older stream terraces, the soils have developed to maturity. On the stronger slopes, however, geologic erosion has removed the soil material so rapidly that the depth to bedrock, in some places, has been kept shallow. Consequently, the soils have had less chance of developing. On the first bottoms and in the areas of local alluvium, the soil materials have been in place too short a time to allow a mature profile to develop.

Living organisms.—The kinds and numbers of plants and animals that live on and in the soil are determined, in large part, by the climate and, to varying degrees, by parent materials, topography, and time (or age of the soil). Bacteria, fungi, and other micro-organisms aid in weathering rock and decomposing organic matter.

The larger plants furnish organic matter. They also transfer elements from the subsoil to the surface soil by assimilating these elements into the tissue of the plant and then depositing this tissue on the soil surface as fallen fruit, leaves, or stems. When trees are uprooted, soil material is carried to the surface by the upturned roots. Earthworms and other small invertebrates carry on a slow, but continual, cycle of soil mixing. Soil may be altered chemically when ingested by earthworms. The fungi and other micro-organisms that live in the soil are most numerous by far in the uppermost few inches.

Practically all of the soils of the county contain literally millions of micro-organisms, insects, small plants, and small animals in each cubic foot. These organisms exert a continual effect on the physical and chemical properties of the soils.

Previous to about 1800, the uplands of Douglas County were covered by forests consisting mainly of oak and hickory but including a few pines. First-bottom soils were generally covered by yellow-poplar, gum, ash, oak, willow, and beech. Most of these areas were cleared and cultivated at one time, but many of them are now covered by pines.

Man has become important to the future direction and rate of development of the soils. The clearing of the forests, the cultivation of the soils, and the introduction of new kinds of plants will be reflected in the direction and rates of soil genesis in the future. Except for a sharp reduction in the organic content of soils after a few months under cultivation, and loss of the somewhat coarser textured eluviated layer as a result of the more rapid erosion on most sloping areas under cultivation, few results of these changes can be seen as yet. Some results probably will not be evident for many centuries. Nevertheless, the complex of living organisms affecting soil genesis in Douglas County has been drastically changed as a result of man's activity.

Climate.—Climate, as a genetic factor, affects the physical, chemical, and biological relationships in the soil profile primarily through the influence of precipitation and temperature. Water dissolves minerals, supports biological activity, and transports mineral and organic residues through the soil profile. The amount of water that percolates through the soil at a given point is dependent upon rainfall, relative humidity, length of the frost-free period, soil permeability, and physiographic position. Temperature influences the kinds and growth of organisms and the speed of physical and chemical reactions in the soils.

The climate of Douglas County is of the humid, warm-temperate, continental type characteristic of the south-

TABLE 17.—*Characteristics of soil groups*

Major divisions	Group symbol	Soil description	Value as foundation material [2]	Value as base course directly under bituminous pavement	Value for embankments
Coarse-grained soils (*less than 50 percent passing No. 200 sieve*): Gravels and gravelly soils (*more than half of coarse fraction retained on No. 4 sieve*).	GW	Well-graded gravels and gravel-sand mixtures; little or no fines.	Excellent	Good	Very stable; use in pervious shells of dikes and dams.
	GP	Poorly graded gravels and gravel-sand mixtures; little or no fines.	Good to excellent.	Poor to fair	Reasonably stable; use in pervious shells of dikes and dams.
	GM	Silty gravels and gravel-sand-silt mixtures.	Good	Poor to good	Reasonably stable; not particularly suited to shells, but may be used for impervious cores or blankets.
	GC	Clayey gravels and gravel-sand-clay mixtures.	Good	Poor	Fairly stable; may be used for impervious cores.
Sands and sandy soils (*more than half of coarse fraction passing No. 4 sieve*).	SW	Well-graded sands and gravelly sands; little or no fines.	Good	Poor	Very stable; may be used in pervious sections; slope protection required.
	SP	Poorly graded sands and gravelly sands; little or no fines.	Fair to good	Poor to not suitable.	Reasonably stable; may be used in dike section having flat slopes.
	SM	Silty sands and sand-silt mixtures.	Fair to good	Same	Fairly stable; not particularly suited to shells, but may be used for impervious cores or dikes.
	SC	Clayey sands and sand-clay mixtures.	Fair to good	Not suitable	Fairly stable; use as impervious core for flood-control structures.
Fine-grained soils (*more than 50 percent passing No. 200 sieve*): Silts and clay (*liquid limit of 50 or less*).	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, and clayey silts of slight plasticity.	Fair to poor	Not suitable	Poor stability; may be used for embankments if properly controlled.
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, and lean clays.	Fair to poor	Not suitable	Stable; used in impervious cores and blankets.
	OL	Organic silts and organic clays having low plasticity.	Poor	Not suitable	Not suitable for embankments.
Silts and clays (*liquid limit greater than 50*).	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, and elastic silts.	Poor	Not suitable	Poor stability; use in core of hydraulic fill dam; not desirable in rolled fill construction.
	CH	Inorganic clays having high plasticity and fat clays.	Poor to very poor.	Not suitable	Fair stability on flat slopes; use in thin cores, blankets, and dike sections of dams.
	OH	Organic clays having medium to high plasticity and organic silts.	Poor to very poor.	Not suitable	Not suitable for embankments.
Highly organic soils	Pt	Peat and other highly organic soils.	Not suitable	Not suitable	Not used in embankments, dams or subgrades for pavements.

[1] Based on information in the Unified Soil Classification System, Tech. Memo. No. 3-357, v. 1, 2, and 3. Waterways Experiment Station, Corps of Engineers, 1953 (*11*). Ratings and ranges in test values are for guidance only. Design should be based on field survey and test of samples from construction site.

in Unified soil classification system [1]

Compaction: characteristics and recommended equipment	Approximate range in AASHO maximum dry density [3]	Field (in-place) CBR	Subgrade modulus k	Drainage characteristics	Comparable groups in AASHO classification
	Lb./cu. ft.				
Good; use crawler-type tractor, pneumatic-tire roller, or steel-wheel roller.	125–135	60–80	300+	Excellent	A–1.
Same	115–125	25–60	300+	Excellent	A–1.
Good, but needs close control of moisture; use pneumatic-tire or sheepsfoot roller.	120–135	20–80	200–300+	Fair to practically impervious.	A–1 or A–2.
Fair; use pneumatic-tire or sheepsfoot roller	115–130	20–40	200–300	Poor to practically impervious.	A–2.
Good; use crawler-type tractor or penumatic-tire roller.	110–130	20–40	200–300	Excellent	A–1.
Same	100–120	10–25	200–300	Excellent	A–1 or A–3.
Good, but needs close control of moisture; use pneumatic-tire or sheepsfoot roller.	110–125	10–40	200–300	Fair to practically impervious.	A–1, A–2, or A–4.
Fair; use pneumatic-tire roller or sheepsfoot roller.	105–125	10–20	200–300	Poor to practically impervious.	A–2, A–4, or A–6.
Good to poor; close control of moisture is essential; use pneumatic-tire or sheepsfoot roller.	95–120	5–15	100–200	Fair to poor	A–4, A–5, or A–6.
Fair to good; use pneumatic-tire or sheepsfoot roller.	95–120	5–15	100–200	Practically impervious.	A–4, A–6, or A–7.
Fair to poor; use sheepsfoot roller [4]	80–100	4–8	100–200	Poor	A–4, A–5, A–6, or A–7.
Poor to very poor; use sheepsfoot roller [4]	70–95	4–8	100–200	Fair to poor	A–5 or A–7.
Fair to poor; use sheepsfoot roller [4]	75–105	3–5	50–100	Practically impervious.	A–7.
Poor to very poor; use sheepsfoot roller [4]	65–100	3–5	50–100	Practically impervious.	A–5 or A–7.
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[2] Ratings are for subgrade and subbases for flexible pavement.
[3] Determined in accordance with test designation: T 99–49, AASHO.
[4] Pneumatic-tire rollers may be advisable, particularly when moisture content is higher than optimum.

eastern part of the United States. The average temperatures and distribution of rainfall by months are indicated in table 3. With this kind of climate, the soils are moist much of the time from November 15 through July 31. They are moderately dry much of the time from August 1 through November 14. The surface soil is frozen to a depth of 1 to 3 inches only a few days during the year.

Because the climate throughout the county is nearly uniform, it has not caused differences in the soils. Some of the soils are similar, even though they developed from different parent materials. As expected under this type of climate, most of the soils in Douglas County are highly weathered, leached, strongly acid, and low in fertility.

Morphology and Classification of Soils

The natural soil classifications used in the United States (7) consists of six categories. Beginning at the top, they are the order, suborder, great soil group, family, series, and type.

The highest category consists of three orders, but thousands of soil types are recognized in the lowest category. The suborder and family categories have never been fully developed and, thus, have been little used. Attention has largely been directed toward great soil groups, series, and types. Groups in the highest category of the classification scheme are the zonal, intrazonal, and azonal orders (7).

The zonal order comprises soils with evident, genetically related horizons that reflect the predominant influence of climate and living organisms in their formation. In Douglas County the great soil groups in the zonal order are the Red-Yellow Podzolic, the Reddish-Brown Lateritic, and the Gray-Brown Podzolic soils.

The intrazonal order includes soils with evident, genetically related horizons that reflect the dominant influence of a local factor of topography or parent materials over the effects of climate and living organisms. In Douglas County the one great soil group in the intrazonal order is the Low-Humic Gley.

The azonal order consists of soils that lack distinct, genetically related horizons because of the youngness or resistance of the parent material to the soil-forming processes. The great soil groups in this order represented in Douglas County are the Regosols and Alluvial soils.

Soils of the Red-Yellow Podzolic great soil group occupy more than 80 percent of the acreage in the county. Of this acreage, 60 percent consists of soils that conform to the standard, or central, concept of the Red-Yellow Podzolic great soil group; in about 2.5 percent of the acreage, the soils have some characteristics that represent an intergrade toward the Reddish-Brown Lateritic great soil group; in 1 percent, the soils have some characteristics that represent an intergrade toward the Low-Humic Gley great soil group; and in about 18 percent, the soils have some characteristics that represent an intergrade toward Lithosols.

Soils that conform to the central concept of the Reddish-Brown Lateritic great soil group occupy about 1 percent of the county; those that have some characteristics that represent an intergrade toward Lithosols, about 5 percent. Gray-Brown Podzolic soils occupy less than 0.5 percent, and Low-Humic Gley soils, about 1.3 percent.

Of the azonal soils, Regosols account for about 0.2 percent of the acreage in the county, and Alluvial soils that are within the central concept for the group, about 2 percent. Alluvial soils that have some characteristics that represent an intergrade toward Low-Humic Gley soils occupy about 1 percent of the county. The rest of the county consists of miscellaneous land types, water, and unclassified urban areas.

Table 18 lists the soil series by great soil groups and orders, and gives some of the distinguishing characteristics of each series. A detailed profile description of each soil series is in the section, "Descriptions of Soils." Each great soil group represented in Douglas County is discussed in the following pages.

Red-Yellow Podzolic soils

The Red-Yellow Podzolic great soil group consists of well-developed, well-drained, acid soils that have a thin organic A_0 and an organic-mineral A_1 horizon. The A_1 horizon is underlain by a light-colored, bleached A_2 horizon that overlies a red, yellowish-red, or yellow and more clayey B_2 horizon. The parent materials are all more or less siliceous. Coarse, reticulate streaks or mottles of red, brown, and light gray are characteristic of the deep horizons where parent materials are thick (6). Kaolinite is the dominant clay mineral. The cation exchange capacity is low, and percentage of base saturation is very low. The subsoils have moderate, subangular blocky structure and colors of high chroma. In general, soils of this great soil group in Douglas County have a cation exchange capacity of less than 20 milliequivalents per 100 grams of soil and a percentage of base saturation ranging from 5 to 30. Except for the Altavista soil, all of the Red-Yellow Podzolic soils have high chromas in the B_2 layer.

All of the soils in Douglas County fitting the central concept of the Red-Yellow Podzolic group originally had a dark-colored, but thin, A_1 horizon and a well-defined A_2 horizon. Plowing and erosion have disturbed these horizons so that the present surface layer consists of mixed material of the original A_1 and A_2 horizons, or is predominantly mixed material of the A_2 and B horizons, or is predominantly material from the B horizon. In most areas that are not severely eroded, the surface soil is strongly acid, granular sandy loam to sandy clay loam. The B horizon has moderate, medium, subangular blocky structure. It generally contains from two to six times as much clay as the A horizon and nearly twice as much clay as the C horizon. This last characteristic is not common to certain Red-Yellow Podzolic soils in some other parts of the country. Clay films are common to prominent in the B_2 horizon. The C horizon has weaker structure than the B horizon. It is more mottled and variable in color, and, as a rule, it is more strongly acid.

The Madison and Wickham soils are examples of Red-Yellow Podzolic soils with subsoils that have a red hue (2.5YR) and high chroma (6 or more). They have moderate, medium, subangular blocky structure. The Madison soils are more micaceous than the Wickham soils.

The Appling and Altavista soils are distinguished from the Madison and Wickham soils by their less red profiles. In the Appling profile, yellowish red rather than red predominates below a depth of 24 inches. The entire B hori-

TABLE 18.—*Characteristics and genetic relationships of soil series*

ZONAL

Great soil group and soil series	Brief profile description [1]	Position	Soil drainage	Slope range	Parent material	Degree of profile development [2]
Red-Yellow Podzolic soils—						
Central concept:						
Madison	Brown gravelly sandy loam over friable red clay; highly weathered mica schist at a depth of 36 to 60 inches.	Upland slopes and ridges.	Good	*Percent* 2 to 25	Material weathered from mica schist.	Strong.
Wickham	Brown sandy loam over friable to firm, red clay; a layer of weakly cemented, water-rounded pebbles at a depth of 36 to 72 inches.	High terraces	Good	2 to 10	Old alluvium	Strong.
Appling	Yellowish-brown or grayish-brown sandy loam over red and yellowish-brown, mottled sandy clay; highly weathered granitic rock at a depth of 36 to 50 inches.	Upland slopes and ridges.	Good	2 to 15	Material weathered from gneiss and granite schist.	Strong.
Altavista	Pale-olive fine sandy loam over firm, mottled silty clay loam or sandy clay loam; sandy clay loam and layers of sand and gravel at a depth of 36 to 48 inches.	Low terraces	Moderately good.	2 to 6	Old alluvium	Strong.
Grading toward Reddish-Brown Lateritic:						
Lloyd	Dark-brown sandy loam over dark-red clay that is friable when moist and very hard when dry; highly weathered gneiss, diorite, and hornblende schist at a depth of 48 to 65 inches.	Upland slopes and ridges.	Good	2 to 25	Material weathered from diorite, hornblende schist, and gneiss.	Strong.
Grading toward Low-Humic Gley:						
Helena	Dark grayish-brown sandy loam over very firm to extremely firm, mottled yellowish-brown and gray sandy clay; aplitic granite weathered to sandy clay loam at a depth of 20 to 30 inches.	Upland slopes	Moderately good to somewhat poor.	2 to 10	Material weathered from aplitic granite.	Medium to strong.
Augusta	Grayish-brown silt loam over mottled pale-brown, light-gray, and reddish-yellow, friable to firm sandy clay loam; light-gray fine sandy loam at a depth of 32 to 42 inches.	Low terraces	Somewhat poor.	0 to 2	Old alluvium	Medium.
Colfax	Very dark grayish-brown sandy loam over mottled light olive-gray, friable or sticky sandy clay; mottled sandy loam from disintegrated granite or gneiss at a depth of 30 to 40 inches.	Around the heads of drainageways and on low saddles.	Somewhat poor.	2 to 6	Material weathered from granite and gneiss.	Medium.
Grading toward Lithosols:						
Louisa	Brown fine sandy loam over a thin, discontinuous layer of yellowish-red to red, friable, micaceous sandy clay loam to silty clay; highly weathered mica schist at a depth of 12 to 20 inches.	Upland slopes	Somewhat excessive.	10 to 40	Material weathered from mica schist.	Medium to weak.
Louisburg	Pale-olive loamy sand over yellowish-brown, friable sandy clay loam; hard or highly weathered granitic rock at a depth of 10 to 22 inches.	Upland slopes and ridges.	Somewhat excessive.	2 to 40	Material weathered from granite.	Medium to weak.
Wilkes	Pale-brown sandy loam over very firm clay to friable sandy clay loam; partly weathered fragments of mixed acidic and basic rocks at a depth of 10 to 20 inches.	Upland slopes	Somewhat excessive.	6 to 15	Material weathered from mixed acidic and basic rocks.	Weak.

TABLE 18.—*Characteristics and genetic relationships of soil series*—Continued

Great soil group and soil series	Brief profile description [1]	Position	Soil drainage	Slope range	Parent material	Degree of profile development [2]
				Percent		
Reddish-Brown Lateritic soils— Central concept: Davidson	Dark reddish-brown loam over dark-red, friable to firm clay; highly weathered diorite and hornblende gneiss at a depth of 48 to 96 inches.	Upland slopes and ridges.	Good	2 to 15	Material weathered from diorite and hornblende gneiss.	Strong.
Grading toward Planosols: Mecklenburg	Brown sandy loam over yellowish-red, very firm or plastic clay; weathered diorite, mica schist, and gneiss at a depth of 30 to 45 inches.	Upland slopes	Moderately good.	6 to 10	Material weathered from diorite, hornblende gneiss, and mica schist.	Strong.
Grading toward Lithosols: Musella	Reddish-brown to dark-red stony fine sandy loam over dark-red, firm sandy clay loam or clay; hard or weathered diorite and hornblende gneiss at a depth of 12 to 20 inches.	Upland slopes	Somewhat excessive.	6 to 25	Material weathered from diorite and hornblende gneiss.	Medium.
Gray-Brown Podzolic soils— Central concept: State	Brown fine sandy loam over friable, strong-brown fine sandy clay loam; layers of sand, gravel, and silty clay loam at a depth of 40 to 54 inches.	Low terraces	Good	0 to 6	Old alluvium	Medium.
INTRAZONAL						
Low-Humic Gley soils— Central concept: Wehadkee	Gray silty clay loam; massive, slightly plastic and sticky; underlain by layers of sand, sandy loam, and silty clay loam at a depth of 30 to 40 inches.	Flood plain	Poor	0 to 2	Recent alluvium	Weak.
AZONAL						
Regosols— Central concept: Molena	Dark grayish-brown loamy sand over dark-brown to strong-brown loamy sand; sandy clay loam to sandy loam at a depth of 36 to 60 inches.	High terraces	Somewhat excessive.	2 to 10	Old alluvium	Weak.
Alluvial soils— Central concept: Congaree	Dark yellowish-brown silt loam or fine sandy loam over brown silt loam or fine sandy loam; layers of sand and silty clay loam at a depth of 32 to 56 inches.	Flood plain	Good	0 to 2	Recent alluvium	Weak.
Buncombe	Olive-gray, pale-olive, or pale-yellow loamy sand to a depth of more than 48 inches.	Flood plain	Somewhat excessive.	0 to 6	Recent alluvium	Weak.
Grading toward Low-Humic Gley: Chewacla	Dark-brown silt loam or fine sandy loam over faintly mottled, dark grayish-brown, very friable silt loam or fine sandy loam; layers of gray and brown sandy loam to silty clay loam at a depth of 32 to 48 inches.	Flood plain	Moderately good to somewhat poor.	0 to 2	Recent alluvium	Weak.

[1] These descriptions are of soil profiles not greatly affected by accelerated erosion.

[2] The degree of profile development measured by the number of important genetic horizons and the degree of contrast between them.

zon of the Altavista soil is yellowish brown or yellow. In both of these series, the soils have reticulate or mottled color patterns below the B horizon. The Appling soils, however, have few or no gray mottlings within their described profile, their mottlings being contrasts in reds and yellows. The Altavista soil has a few grayish (pale-olive) mottles at a depth of 20 inches, and mottles are abundant below a depth of 30 to 36 inches. In this respect the Altavista series represents a gradation toward the Low-Humic Gley group. The strong mottling, however, is at a greater depth in the Altavista soil than in the Helena, Augusta, and Colfax soils, which have more features in common with the soils of the Low-Humic Gley group.

The low contrast between the A_1 and A_2 horizons in the soils of the Lloyd series characterizes that series as gradational to soils of the Reddish-Brown Lateritic great soil group. The subsoil has the color, structure, and clay characteristics of the reddest of the Red-Yellow Podzolic soils, and this color is identical to that of Reddish-Brown Lateritic soils. The parent material of the Lloyd soils is less micaceous than that of Red-Yellow Podzolic soils in general.

Red-Yellow Podzolic soils that grade toward Low-Humic Gley soils belong to the Helena, Augusta, and Colfax series. These soils are somewhat poorly drained. They have strong color (especially value) contrast between the A_1 and A_2 horizons. Their B horizons are predominantly mottled yellow and gray, with little or no red. All of these soils are strongly gleyed below a depth of about 30 inches.

The Helena soils have strong structure and prominent clay films in the B horizon, and the dominant color is of higher chroma than that of the Augusta and Colfax soils. Nevertheless, the colors—predominantly yellowish brown (10YR 5/6) with light yellowish-brown (10YR 6/4) mottles—are weaker than for soils fitting the central concept for Red-Yellow Podzolic soils. The very firm clay of the B_3 horizon lends some characteristics of the Planosol group, but the textural gradation from the B_2 to the B_3 horizon is not so abrupt as is considered characteristic of claypans.

The Augusta and Colfax soils have very weak color characteristics in the B horizon, as gray is more common than in the Helena soils, and the structure and clay films are less well developed. The B_3 horizon of the Colfax soil, like that of the Helena profile, is very firm clay, but the gradation is too diffuse to be characteristic of Planosols. The Augusta soil is coarser textured and more friable throughout the profile than the Helena and Colfax soils.

The Louisa, Louisburg, and Wilkes series consist of Red-Yellow Podzolic soils that grade toward Lithosols. Lithosols are an azonal group of soils that have an incomplete solum or no clearly expressed soil morphology. They consist of a freshly and imperfectly weathered mass of hard rock or hard rock fragments that is largely confined to steeply sloping land. The soils in all three of these series have gentle to steep slopes, but in most of their acreage the slopes are strong to steep. Geologic erosion has more nearly kept pace with soil-forming processes than in the typical Red-Yellow Podzolic soils. The depth to bedrock is shallower than for the central concept of Red-Yellow Podzolic soils. In most places it is between 12 and 36 inches.

The color contrast between the A_1 and A_2 horizons is less than for the typical soils of this great soil group. The B horizons are thinner and less distinct and clay films are not so strongly developed. The B horizons in many places are discontinuous, the A horizon in such places being underlain directly by the C horizon.

In the Louisa soils the B horizon is discontinuous and thin but is moderately well developed. It is red in hue, of high chroma, and, though thin, has moderate, subangular blocky structure. The soil, as well as the parent rock, is high in mica. The Louisburg soils are less red than the Louisa, but the structure of the discontinuous B horizon is moderate. Because their parent material weathered from granite, the Louisburg soils have a lower content of mica than the Louisa soils. The Wilkes soils are variable because they were developed from mixed acidic and basic igneous and metamorphic rocks. In places where the parent material was more clayey than normal, that is, where it came from less siliceous rock, the thin B horizon has strong structure and prominent clay films.

Reddish-Brown Lateritic soils

Reddish-Brown Lateritic soils have a dark reddish-brown mineral surface layer that rests upon a dark-red, clayey illuvial B horizon. These soils lack a light-colored eluvial A_2 horizon, and their B horizon, or subsoil, is redder than is characteristic of the Red-Yellow Podzolic soils. They were developed in a moist, warm-temperate climate. Evidence indicates that the vegetation under which they developed consisted of deciduous hardwoods.

These soils are medium to strongly acid and are low in organic matter. The base exchange capacity of their subsoils is less than 20 milliequivalents per 100 grams of soil, and base saturation is less than 30 percent. The soils of the Davidson, Musella, and Mecklenburg series are the only soils in Douglas County in this group. They were formed in materials weathered from basic igneous and metamorphic rocks. The Davidson series represents the central concept of this great soil group. The soils of that series are distinguished from the Madison soils chiefly by their darker (dark reddish-brown) A horizon and their lower content of coarse fragments of rock, sand, and mica throughout the profile. Kaolinite and vermiculite are the dominant clay minerals.

The Mecklenburg series represents an intergrade toward Planosols. The color is somewhat less red than that in the Madison and Musella soils. The B horizon is more prominent than that in the Musella soils. It is more plastic and firm than that in the Madison soils and represents a more abrupt and greater contrast from the A horizon than is true in the Madison soils.

The Musella series represents an intergrade toward Lithosols. The color throughout the solum resembles that of the soils in the Davidson series. Because Musella soils have stronger slopes than the Davidson, they have been more subject to geologic erosion. The B horizon is thinner and discontinuous, and there is more sand throughout the profile. There are coarse fragments of

rock throughout the profile, and depth to bedrock is less than in the Davidson soils.

Gray-Brown Podzolic soils

The Gray-Brown Podzolic great soil group consists of a zonal group of soils having a comparatively thin, organic covering and organic-mineral layers. These layers overlie a grayish-brown, leached layer that rests upon an illuvial brown horizon. The soils were formed under a deciduous forest in a temperate, moist climate (*7*).

In general, these soils have a somewhat darker, less leached appearing A_2 horizon than do the Red-Yellow Podzolic soils. The B horizon has a higher percentage of base saturation; its chroma is lower, and the hue is less red. The State series is the only series in this great soil group in the county. The difference between the State soil and the Red-Yellow Podzolic soils apparently results because the State soil is on low stream terraces and has been subjected to active soil-forming agencies for a shorter time. Compared to the Wickham soil, which is on higher, older stream terraces and belongs to the Red-Yellow Podzolic great soil group, the State soil has less contrast between the A_1 and A_2 horizons, the structure in the B horizon is weaker, and the clay films in the B horizon are less prominent. The subsoil is less red and the chroma is lower. The content of organic matter in the A horizon is ordinarily not so low as it is in the associated Red-Yellow Podzolic soils. The reaction is medium to strongly acid.

Low-Humic Gley soils

The Low-Humic Gley great soil group consists of imperfectly to poorly drained soils in the intrazonal order. These soils have very thin surface horizons that are moderately high in organic matter. These horizons overlie mottled gray and brown, gleylike mineral horizons that have a low degree of textural differentiation (*6*). The Wehadkee series is the only series in this group in Douglas County. The soil occupies lower positions on bottom lands than other soils in the county. The water table is at or near the surface during the wetter periods, but, during the driest periods, it is well below the surface. Virgin areas have a dark, but thin, A_1 horizon. Structure is weak. The soil is strongly acid, and percentage of base saturation is low.

Regosols

Regosols are an azonal group of soils consisting of deep, unconsolidated rock, or soft mineral deposits, in which few or no clearly expressed soil characteristics have developed. The Molena series is the only series of this group in the county. In the section, "Descriptions of Soils," a profile having an A_p horizon is described for this series.

Under virgin conditions, this soil normally has an A_1 horizon that is poorly distinguished from the underlying C horizon. The structure and textural characteristics of a B horizon are lacking. Chroma and red hue increase, with the increasing depth, throughout the entire profile of this soil. This indicates that the color is an inherited characteristic altered by weathering only in the uppermost part of the profile, or chiefly in the A_p horizon. Molena soils are strongly acid and are low in clay.

Alluvial soils

Alluvial soils consist of an azonal group of soils developed from transported and relatively recently deposited material, or alluvium. They are characterized by a weak modification, or none, of the original material by soil-forming processes. In Douglas County the Congaree and Buncombe series represent the central concept for this great soil group. Soils of both series have formed in young material and show little profile development. They are subject to flooding, but, during periods of normal streamflow, they are free of excess soil water. All of the soils in this group are slightly darker in the upper part of the profile; this indicates that organic matter has accumulated in that part. All are medium to strongly acid and are low in percentage of base saturation. The Buncombe soils are very low in clay, but the Congaree soils have enough clay to impart a loam texture to the uppermost 2 or 3 feet of the profile.

In this county the Chewacla series consists of only one soil. This soil is in the Alluvial great soil group but grades toward the Low-Humic Gley group. It is moderately well drained to somewhat poorly drained. The upper part, ranging from 10 to 20 inches in thickness, is free of gleying, but the lower part has indications of at least moderate gleying. In general, the uppermost layer has a slightly darker color than that of the well-drained or excessively drained associated Alluvial soils. There is no clear evidence of a B horizon in the soil. The entire profile is strongly acid, and the percentage of base saturation is low.

Glossary

Acidity, soil. The degree of acidity or alkalinity of a soil mass is expressed in pH values, or in words, as follows:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6–7.3
Very strongly acid.	5.5–5.0	Mildly alkaline	7.4–7.8
		Moderately alkaline.	7.9–8.4
Strongly acid	5.1–5.5		
Medium acid	5.6–6.0	Strongly alkaline	8.5–9.0
Slightly acid	6.1–6.5	Very strongly alkaline.	9.1 and higher.

Alluvium (alluvial deposits). Soil materials deposited on land by streams.

Bedrock. The solid rock that underlies soils and other surface formations.

Clay. See Texture, soil.

Colluvium (colluvial deposits). Mixed deposits of rock fragments and coarse soil materials near the bases of slopes. The deposits have accumulated as the result of soil creep, slides, or local wash.

Consistence, soil. The nature of soil material that is expressed by the resistance of the individual particles to separating from one another (cohesion) or by the ability of the soil mass to undergo a change in shape without breaking (plasticity). The consistence varies with the moisture content. Thus, a soil aggregate or clod may be hard when dry and plastic when wet. Terms used to describe consistence are—

Friable. When moist, easily crushed by hand and coheres when pressed together. Friable soils are easily tilled.

Firm. When moist, crushes under moderate pressure, but resistance is distinctly noticeable. Firm soils are likely to be difficult to till.

Hard. When dry, is moderately resistant to pressure; can be broken in the hands without difficulty but is barely breakable between thumb and forefinger.

Indurated. Hard, very strongly cemented; brittle; does not soften under prolonged wetting.

Loose. Noncoherent when moist or dry. Loose soils are generally coarse textured and are easily tilled.

Plastic. When wet, retains an impressed shape and resists being deformed; plastic soils are high in clay and are difficult to till.

Soft. Weakly coherent and fragile; when dry, breaks to powder or individual grains under slight pressure.

Drainage, soil. The rapidity and extent of the removal of water from the soil, in relation to additions, especially by runoff, by flow through the soil to underground spaces, or by a combination of both processes.

Erosion, soil. The detachment and movement of the solid material of the land surface by wind, moving water, or ice, and by such processes as landslides and creep.

Fertility, soil. The presence in a soil of the necessary elements, in sufficient amounts, in the proper balance, and available for the growth of specified plants, when other factors such as light, temperature, and the physical condition of the soil are favorable.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. Nearly level land occupying the bottom of the valley of a present stream and subject to flooding unless protected artificially.

Friable. See Consistence, soil.

Galled spots. Small areas that are bare because erosion has removed the soil.

Horizon, soil. A layer of soil, approximately parallel to the soil surface, that has distinct characteristics produced by soil-forming processes.

Igneous rock. Rock that has been cooled from molten mineral material, such as granite, syenite, diorite, and gabbro.

Infiltration rate. The rate at which water is penetrating the surface of the soil at any given instant, usually expressed in inches per hour. May be limited either by the infiltration capacity of the soil or by the rate at which water is applied to the soil surface.

Loam. See Texture, soil.

Metamorphic rock. A rock that has been greatly altered from its original condition. Heat, pressure, and water are the chief agents in producing metamorphic rock. Igneous and sedimentary rocks may be changed to metamorphic rock, or one metamorphic rock may be changed to another. Examples: Gneiss, schist, and slate.

Moisture-supplying capacity. The capacity of a soil to store water and hold it available to plants.

Mottled (or mottling). Irregularly marked with spots of different colors.

Parent material (soil). The unconsolidated mass of rock material (or peat) from which the soil profile develops.

Parent rock (soils). The rock from which the parent materials of soils are formed.

Permeability, soil. That quality of the soil that enables it to transmit air and water. Moderately permeable soils transmit air and water readily. Such conditions are favorable for the growth of roots. Slowly permeable soils allow water and air to move so slowly that the growth of roots may be restricted. Rapidly permeable soils transmit air and water rapidly, and roots make good growth.

Plant nutrients. The elements or groups of elements taken in by the plant that are essential to its growth and are used by it in elaboration of its food and tissues. Includes nutrients obtained from fertilizer ingredients.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material. (See Horizon, soil.)

Reaction. See Acidity, soil.

Relief. The elevations or inequalities of the land surface, considered collectively.

Residuum. Unconsolidated and partly weathered parent material for soils, which is presumed to have developed from the same kind of rock as that on which it lies.

Sand. See Texture, soil.

Sedimentary rock. A rock composed of particles deposited from suspension in water. Chief groups of sedimentary rocks are conglomerates, from gravels; sandstones, from sand; shales, from clay; and limestones, from soft masses of calcium carbonate.

Silt. See Texture, soil.

Slope. The incline of the surface of a soil. It is usually expressed in percentage of slope, which equals the number of feet of fall per 100 feet of horizontal distance.

Soil. The natural medium for the growth of land plants. A soil is a natural three-dimensional body on the surface of the earth, unlike the adjoining bodies.

Soil classes. Based on the relative proportion of soil separates. The principal classes, in increasing order of the content of the finer separates, are as follows: Sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. (See also Texture, soil.)

Soil separates. The individual size groups of soil particles, as sand, silt, and clay.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soils includes the A and B horizons. Usually, the characteristics of the material in these horizons are unlike those of the underlying parent material. The living roots and other plant and animal life characteristic of the soils are largely confined to the solum.

Structure, soil. The morphological aggregates into which the individual soil particles are arranged. Structure may refer to their natural arrangement in the soil when in place and undisturbed or to their arrangement at any degree of disturbance. Soil structure is classified according to grade, class, and type.

Grade. Distinctness of aggregation. Grade expresses the differential between cohesion within aggregates and adhesion between aggregates. Terms: Structureless (single grain or massive), weak, moderate, and strong.

Class. Size of soil aggregates. Terms: Very fine or very thin, fine or thin, medium, coarse or thick, and very coarse or very thick.

Type. Shapes for soil aggregates. Terms: Platy, prismatic, columnar, blocky, subangular blocky, granular and crumb. (Example of soil-structure grade, class, and type: Moderate, coarse, blocky.)

Subsoil. Technically, the B horizon of soils with distinct profiles; roughly, that part of the profile below plow depth.

Substratum. Any layer lying beneath the solum, or true soil.

Surface soil. That part of the soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness.

Terrace (geologic). A flat or undulating plain, commonly rather narrow and generally with a steep front, that borders a river, lake, or the sea. Many streams are bordered by a series of terraces at different levels. The various levels indicate the location of the flood plains during successive periods. Many older terraces have become more or less hilly through stream dissection, but they are still regarded as terraces.

Texture, soil. Refers to the relative proportions of the various size groups of individual soil grains in a mass of soil. Specifically, it refers to the proportions of sand, silt, and clay. A coarse-textured soil is one high in content of sand; a fine-textured soil has a large proportion of clay. Verbal definitions of the soil textural classes, defined according to size distribution of mineral particles less than 2 millimeters in diameter, are as follows:

Sand. Small fragments of rocks or minerals with diameters ranging from 0.05 millimeter (0.002 in.) to 2.0 millimeters (0.079 in.). Soil material that contains 85 percent or more of sand; the percentage of silt, plus 1½ times the percentage of clay, shall not exceed 15.

Loamy sand. Soil material that contains at the upper limit 85 to 90 percent sand, and the percentage of silt plus 1½ times the percentage of clay is not less than 15; at the lower limit, it contains not less than 70 to 85 percent sand, and the percentage of silt plus twice the percentage of clay does not exceed 30.

Sandy loam. Soil material that contains either 20 percent clay or less, and the percentage of silt plus twice the percentage of clay exceeds 30, and 52 percent or more sand; or less than 7 percent clay, less than 50 percent silt, and between 43 percent and 52 percent sand.

Loam. Soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

Silt loam. Soil material that contains 50 percent or more silt and 12 to 27 percent clay, or 50 to 80 percent silt and less than 12 percent clay.

Silt. Small mineral soil grains ranging from 0.05 millimeter (0.002 in.) to 0.002 millimeter (0.000079 in.) in diameter. Soil material that contains 80 percent or more silt and less than 12 percent clay.

Sandy clay loam. Soil material that contains 20 to 35 percent clay, less than 28 percent silt, and 45 percent or more sand.

Clay loam. Soil material that contains 27 to 40 percent clay and 20 to 45 percent sand.

Silty clay loam. Soil material that contains 27 to 40 percent clay and less than 20 percent sand.

Sandy clay. Soil material that contains 35 percent or more clay and 45 percent or more sand.

Silty clay. Soil material that contains 40 percent or more clay and 40 percent or more silt.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter (0.000079 in.) in diameter. Soil material that contains 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Tilth, soil. The ease with which a soil can be tilled; the physical condition of a soil with respect to its fitness for the growth of a specified plant or sequence of plants.

Upland (geologic). Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace.

Literature Cited

(1) American Association of State Highway Officials.
1955. STANDARD SPECIFICATIONS FOR HIGHWAY MATERIALS AND METHODS OF SAMPLING AND TESTING. Ed. 7, 2 v., illus.

(2) Boswell, F. C., Anderson, O. E., and Stacey, S. V.
1959. SOME EFFECTS OF IRRIGATION, NITROGEN, AND PLANT POPULATION ON CORN. Ga. Agr. Expt. Sta. Bul. N. S. 60, 51 pp., illus.

(3) Carter, Horace S.
1957. LATE SPRING AND EARLY FALL FREEZES IN GEORGIA. Ga. Agr. Expt. Sta. Bul. N. S. 41, 22 pp. illus.

(4) Carter, R. W., and Herrick, S. M.
1951. WATER RESOURCES OF THE ATLANTA METROPOLITAN AREA. Geol. Survey Cir. 148, 19 pp., illus.

(5) Georgia Division of Mines, Mining and Geology.
1939. GEOLOGIC MAP OF GEORGIA. Prepared by Ga. Div. of Mines, Mining and Geol. in cooperation with the U.S. Dept. of Int., Geol. Survey, 1 p.

(6) Thorp, James, and Smith, Guy D.
1949. HIGHER CATEGORIES OF SOIL CLASSIFICATION: ORDER, SUBORDER, AND GREAT SOIL GROUPS. Soil Sci. 67: 117–126.

(7) U.S. Department of Agriculture.
1938. SOILS AND MEN. U.S. Dept. Agr. Ybk., pp. 979–1001, illus.

(9) ———
1956. THE TIMBER SUPPLY SITUATION IN GEORGIA. Forest Resource Report No. 12, 51 pp., illus.

(9) ———
1929. VOLUME, YIELD, AND STAND TABLES FOR SECOND-GROWTH SOUTHERN PINES. Misc. Pub. No. 50, 202 pp., Washington, D.C. [Now out of print.]

(10) Van Bavel, C. H. M., and Carreker, John R.
1957. AGRICULTURAL DROUGHT IN GEORGIA. Ga. Agr. Expt. Sta. Tech. Bul. N. S. 15, 41 pp., illus.

(11) Waterways Experiment Station, Corps of Engineers.
1953. UNIFIED SOIL CLASSIFICATION SYSTEM. Tech. Memo. No. 3–357, v. 1.

GUIDE TO MAPPING UNITS[1]

Map symbol	Mapping unit	Page	Capability unit	Page	Woodland group	Page
AkB2	Altavista fine sandy loam, 2 to 6 percent slopes, eroded	13	IIe-2	35	4	54
Alm	Alluvial land, moderately well drained	12	IIw-2	36	2	52
Alp	Alluvial land, somewhat poorly drained	13	IIIw-2	40	2	52
AmB2	Appling sandy loam, 2 to 6 percent slopes, eroded	14	IIe-2	35	1	51
AmC2	Appling sandy loam, 6 to 10 percent slopes, eroded	14	IIIe-2	38	1	51
AmD2	Appling sandy loam, 10 to 15 percent slopes, eroded	15	IVe-1	41	1	51
AnC3	Appling sandy clay loam, 6 to 10 percent slopes, severely eroded	15	IVe-1	41	4	54
AnD3	Appling sandy clay loam, 10 to 15 percent slopes, severely eroded	15	VIe-2	44	4	54
Asl	Augusta silt loam	15	IIIw-3	40	2	52
Bfs	Buncombe loamy sands, 0 to 6 percent slopes	16	IVs-1	43	2	52
Cfs	Chewacla soils	16	IIIw-2	40	2	52
CiB	Colfax sandy loam, 2 to 6 percent slopes	17	IIIw-3	40	2	52
Cng	Congaree soils	17	IIw-2	36	2	52
DgB2	Davidson loam, 2 to 6 percent slopes, eroded	18	IIe-1	35	4	54
DgC2	Davidson loam, 6 to 10 percent slopes, eroded	18	IIIe-1	37	4	54
DhB3	Davidson clay loam, 2 to 6 percent slopes, severely eroded	18	IIIe-1	37	4	54
DhC3	Davidson clay loam, 6 to 10 percent slopes, severely eroded	18	IIIe-1	37	4	54
DhD4	Davidson clay loam, 10 to 15 percent slopes, very severely eroded	18	VIe-2	44	8	55
Gul	Gullied land	19	VIIIs-1	46	(2)	
HYB2	Helena sandy loam, 2 to 6 percent slopes, eroded	19	IIe-3	36	4	54
HYC2	Helena sandy loam, 6 to 10 percent slopes, eroded	19	IIIe-3	39	4	54
HYC3	Helena soils, 6 to 10 percent slopes, severely eroded	20	IVe-2	42	4	54
LdB2	Lloyd sandy loam, 2 to 6 percent slopes, eroded	20	IIe-1	35	1	51
LdC2	Lloyd sandy loam, 6 to 10 percent slopes, eroded	20	IIIe-1	37	1	51
LdE2	Lloyd sandy loam, 15 to 25 percent slopes, eroded	21	VIe-2	44	1	51
LeB3	Lloyd clay loam, 2 to 6 percent slopes, severely eroded	21	IIIe-1	37	4	54
LeC3	Lloyd clay loam, 6 to 10 percent slopes, severely eroded	21	IIIe-1	37	4	54
LeC4	Lloyd clay loam, 6 to 10 percent slopes, very severely eroded	21	IVe-1	41	8	55
LeD3	Lloyd clay loam, 10 to 15 percent slopes, severely eroded	21	IVe-1	41	4	54
LeD4	Lloyd clay loam, 10 to 15 percent slopes, very severely eroded	21	VIe-2	44	8	55
LjD	Louisa fine sandy loam, 10 to 15 percent slopes	22	IVe-4	42	5	54
LjD2	Louisa fine sandy loam, 10 to 15 percent slopes, eroded	22	IVe-4	42	5	54
LjE	Louisa fine sandy loam, 15 to 25 percent slopes	22	VIe-3	44	5	54
LjE2	Louisa fine sandy loam, 15 to 25 percent slopes, eroded	22	VIe-3	44	5	54
LjF	Louisa fine sandy loam, 25 to 40 percent slopes	22	VIIe-2	45	5	54
LlB2	Louisburg complex, 2 to 6 percent slopes, eroded	23	IIIe-5	39	3	53
LlC2	Louisburg complex, 6 to 10 percent slopes, eroded	23	IVe-4	42	3	53
LlD2	Louisburg complex, 10 to 15 percent slopes, eroded	23	IVe-4	42	3	53
LmE	Louisburg stony complex, 10 to 40 percent slopes	23	VIIe-2	45	3	53
MhB2	Madison gravelly fine sandy loam, 2 to 6 percent slopes, eroded	24	IIe-1	35	1	51
MhC	Madison gravelly fine sandy loam, 6 to 10 percent slopes	24	IIIe-1	37	1	51

GUIDE TO MAPPING UNITS[1]—Continued

Map symbol	*Mapping unit*	*Page*	*Capability unit*	*Page*	*Woodland group*	*Page*
MhC2	Madison gravelly fine sandy loam, 6 to 10 percent slopes, eroded	24	IIIe-1	37	1	51
MhD	Madison gravelly fine sandy loam, 10 to 15 percent slopes	25	IVe-1	41	1	51
MhD2	Madison gravelly fine sandy loam, 10 to 15 percent slopes, eroded	25	IVe-1	41	1	51
MnE	Madison gravelly fine sandy loam, 15 to 25 percent slopes	25	VIe-2	44	1	51
MhE2	Madison gravelly fine sandy loam, 15 to 25 percent slopes, eroded	25	VIe-2	44	1	51
MiB3	Madison gravelly sandy clay loam, 2 to 6 percent slopes, severely eroded	25	IIIe-1	37	4	54
MiC3	Madison gravelly sandy clay loam, 6 to 10 percent slopes, severely eroded	25	IVe-1	41	4	54
MiC4	Madison gravelly sandy clay loam, 6 to 10 percent slopes, very severely eroded.	26	VIe-2	44	8	55
MiD3	Madison gravelly sandy clay loam, 10 to 15 percent slopes, severely eroded	26	VIe-2	44	6	55
MiD4	Madison gravelly sandy clay loam, 10 to 15 percent slopes, very severely eroded.	26	VIIe-1	45	8	55
MiE3	Madison gravelly sandy clay loam, 15 to 25 percent slopes, severely eroded	26	VIIe-1	45	6	55
MiE4	Madison gravelly sandy clay loam, 15 to 25 percent slopes very severely eroded.	27	VIIe-1	45	8	55
MqC2	Mecklenburg sandy loam, 6 to 10 percent slopes, eroded	27	IIIe-3	39	4	54
MtB	Molena loamy sand, 2 to 6 percent slopes	27	IIs-1	37	4	54
MtC	Molena loamy sand, 6 to 10 percent slopes	28	IIIe-2	38	4	54
MvC2	Musella clay loam, 6 to 10 percent slopes, eroded	28	IVe-2	42	6	55
MvD2	Musella clay loam, 10 to 15 percent slopes, eroded	29	VIe-4	45	6	55
MvE2	Musella clay loam, 15 to 25 percent slopes, eroded	29	VIIe-2	45	6	55
MwC2	Musella stony clay loam, 6 to 10 percent slopes, eroded	29	VIe-1	43	6	55
MwD2	Musella stony clay loam, 10 to 15 percent slopes, eroded	29	VIIe-2	45	6	55
MwE2	Musella stony clay loam, 15 to 25 percent slopes, eroded	29	VIIe-2	45	6	55
MFE	Musella stony fine sandy loam, 15 to 25 percent slopes	28	VIe-1	43	6	55
Rok	Rock outcrop	30	VIIIs-1	46	(2)	
Sne	Local alluvial land	13	I-1	34	2	52
Sta	State fine sandy loam, 0 to 6 percent slopes	30	IIe-2	35	2	52
Weh	Wehadkee silty clay loam	30	IVw-1	43	(2)	
WgB2	Wickham fine sandy loam, 2 to 6 percent slopes, eroded	31	IIe-1	35	1	51
WgC2	Wickham fine sandy loam, 6 to 10 percent slopes, eroded	31	IIIe-1	37	1	51
WhB3	Wickham clay loam, 2 to 6 percent slopes, severely eroded	31	IIIe-1	37	4	54
WhC3	Wickham clay loam, 6 to 10 percent slopes, severely eroded	32	IVe-1	41	4	54
WiC2	Wilkes sandy loam, 6 to 10 percent slopes, eroded	32	IVe-4	42	7	55
WjD2	Wilkes stony sandy loam, 10 to 15 percent slopes, eroded	32	VIIe-2	45	7	55

[1] Table 9, p. 11, gives the proportionate extent of the soils and the acreage in various uses; table 10, p. 47, gives estimated yields per acre of the principal crops; and table 11, p. 50, gives the woodland suitability groupings of the soils. To find the engineering properties of the soils, see section, "Engineering Uses of Soils," p. 56.

[2] Not suitable for trees.

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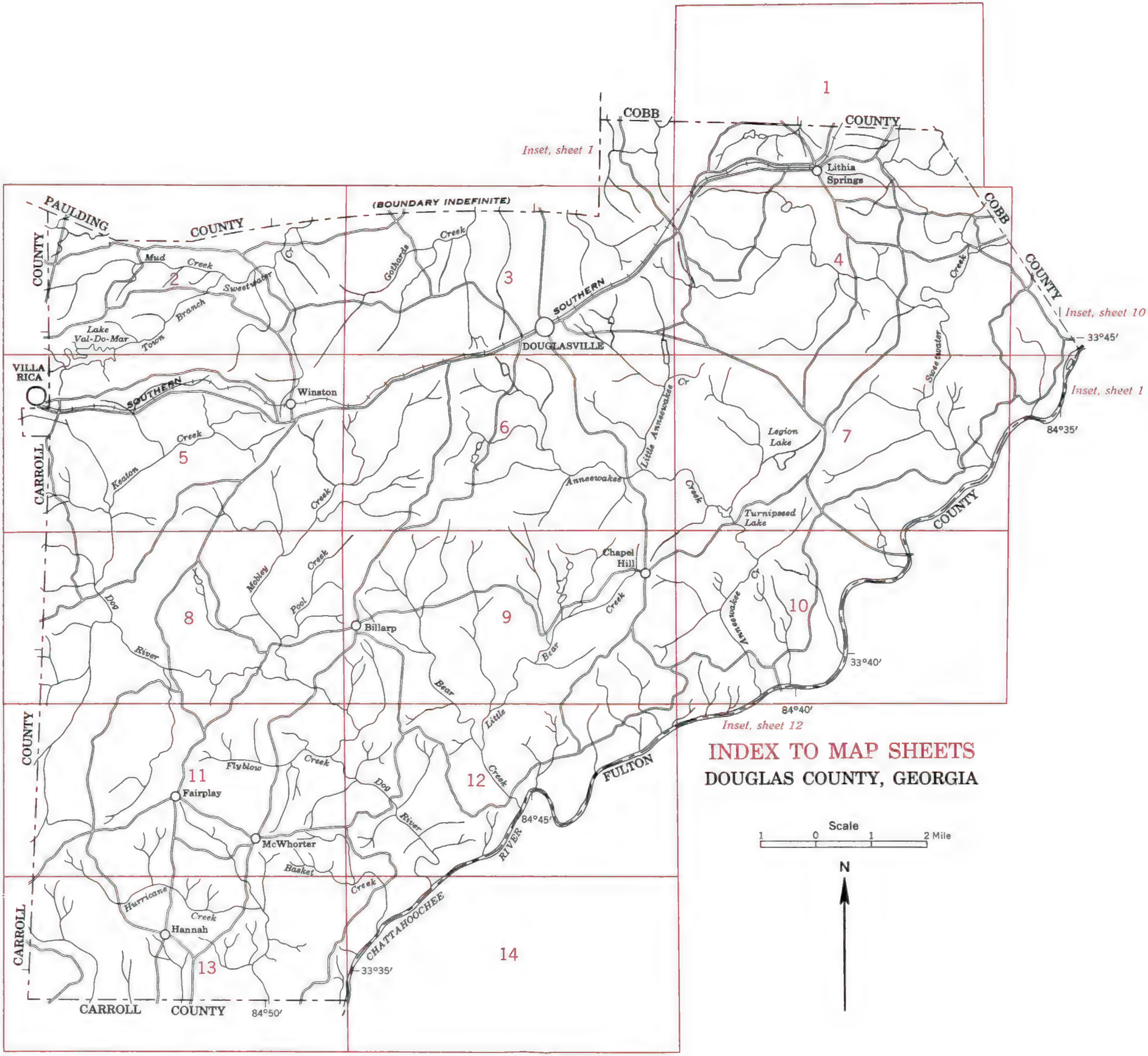

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DOUGLAS COUNTY, GEORGIA

UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATIONS

SOIL LEGEND

The first letter in each soil symbol is the initial of the soil series name. If the third letter is a capital, it denotes the range of slope from A, less than 2 percent, to F, 25 to 40 percent. A number after the slope letter denotes the degree of erosion as given in the soil name. All but two of the symbols that do not contain a slope letter or a number are symbols for nearly level soils, not more than slightly eroded. Gul, Gullied land; and Rok, Rock outcrop, are land types that have a wide range of slope.

SYMBOL	NAME
AkB2	Altavista fine sandy loam, 2 to 6 percent slopes, eroded
Alm	Alluvial land, moderately well drained
Alp	Alluvial land, somewhat poorly drained
AmB2	Appling sandy loam, 2 to 6 percent slopes, eroded
AmC2	Appling sandy loam, 6 to 10 percent slopes, eroded
AmD2	Appling sandy loam, 10 to 15 percent slopes, eroded
AnC3	Appling sandy clay loam, 6 to 10 percent slopes, severely eroded
AnD3	Appling sandy clay loam, 10 to 15 percent slopes, severely eroded
Asl	Augusta silt loam
Bfs	Buncombe loamy sands, 0 to 6 percent slopes
Cfs	Chewacla soils
CiB	Colfax sandy loam, 2 to 6 percent slopes
Cng	Congaree soils
DgB2	Davidson loam, 2 to 6 percent slopes, eroded
DgC2	Davidson loam, 6 to 10 percent slopes, eroded
DhB3	Davidson clay loam, 2 to 6 percent slopes, severely eroded
DhC3	Davidson clay loam, 6 to 10 percent slopes, severely eroded
DhD4	Davidson clay loam, 10 to 15 percent slopes, very severely eroded
Gul	Gullied land
HYB2	Helena sandy loam, 2 to 6 percent slopes, eroded
HYC2	Helena sandy loam, 6 to 10 percent slopes, eroded
HYC3	Helena soils, 6 to 10 percent slopes, severely eroded
LdB2	Lloyd sandy loam, 2 to 6 percent slopes, eroded
LdC2	Lloyd sandy loam, 6 to 10 percent slopes, eroded
LdE2	Lloyd sandy loam, 15 to 25 percent slopes, eroded
LeB3	Lloyd clay loam, 2 to 6 percent slopes, severely eroded
LeC3	Lloyd clay loam, 6 to 10 percent slopes, severely eroded
LeC4	Lloyd clay loam, 6 to 10 percent slopes, very severely eroded
LeD3	Lloyd clay loam, 10 to 15 percent slopes, severely eroded
LeD4	Lloyd clay loam, 10 to 15 percent slopes, very severely eroded
LjD	Louisa fine sandy loam, 10 to 15 percent slopes
LjD2	Louisa fine sandy loam, 10 to 15 percent slopes, eroded
LjE	Louisa fine sandy loam, 15 to 25 percent slopes
LjE2	Louisa fine sandy loam, 15 to 25 percent slopes, eroded
LjF	Louisa fine sandy loam, 25 to 40 percent slopes
LlB2	Louisburg complex, 2 to 6 percent slopes, eroded
LlC2	Louisburg complex, 6 to 10 percent slopes, eroded
LlD2	Louisburg complex, 10 to 15 percent slopes, eroded
LmE	Louisburg stony complex, 10 to 40 percent slopes
MhB2	Madison gravelly fine sandy loam, 2 to 6 percent slopes, eroded
MhC	Madison gravelly fine sandy loam, 6 to 10 percent slopes
MhC2	Madison gravelly fine sandy loam, 6 to 10 percent slopes, eroded
MhD	Madison gravelly fine sandy loam, 10 to 15 percent slopes
MhD2	Madison gravelly fine sandy loam, 10 to 15 percent slopes, eroded
MhE	Madison gravelly fine sandy loam, 15 to 25 percent slopes
MhE2	Madison gravelly fine sandy loam, 15 to 25 percent slopes, eroded
MiB3	Madison gravelly sandy clay loam, 2 to 6 percent slopes, severely eroded
MiC3	Madison gravelly sandy clay loam, 6 to 10 percent slopes, severely eroded
MiC4	Madison gravelly sandy clay loam, 6 to 10 percent slopes, very severely eroded
MiD3	Madison gravelly sandy clay loam, 10 to 15 percent slopes, severely eroded
MiD4	Madison gravelly sandy clay loam, 10 to 15 percent slopes, very severely eroded
MiE3	Madison gravelly sandy clay loam, 15 to 25 percent slopes, severely eroded
MiE4	Madison gravelly sandy clay loam, 15 to 25 percent slopes, very severely eroded
MqC2	Mecklenburg sandy loam, 6 to 10 percent slopes, eroded
MtB	Molena loamy sand, 2 to 6 percent slopes
MtC	Molena loamy sand, 6 to 10 percent slopes
MvC2	Musella clay loam, 6 to 10 percent slopes, eroded
MvD2	Musella clay loam, 10 to 15 percent slopes, eroded
MvE2	Musella clay loam, 15 to 25 percent slopes, eroded
MwC2	Musella stony clay loam, 6 to 10 percent slopes, eroded
MwD2	Musella stony clay loam, 10 to 15 percent slopes, eroded
MwE2	Musella stony clay loam, 15 to 25 percent slopes, eroded
MFE	Musella stony fine sandy loam, 15 to 25 percent slopes
Rok	Rock outcrop
Sne	Local alluvial land
Sta	State fine sandy loam, 0 to 6 percent slopes
Weh	Wehadkee silty clay loam
WgB2	Wickham fine sandy loam, 2 to 6 percent slopes, eroded
WgC2	Wickham fine sandy loam, 6 to 10 percent slopes, eroded
WhB3	Wickham clay loam, 2 to 6 percent slopes, severely eroded
WhC3	Wickham clay loam, 6 to 10 percent slopes, severely eroded
WiC2	Wilkes sandy loam, 6 to 10 percent slopes, eroded
WjD2	Wilkes stony sandy loam, 10 to 15 percent slopes, eroded

Soil map constructed 1960 by Cartographic Division, Soil Conservation Service, USDA, from 1955 aerial photographs. Controlled mosaic based on Georgia plane coordinate system, west zone, transverse Mercator projection, 1927 North American datum.

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Dual
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferries
- Ford
- Grade
- R. R. over
- R. R. under

Tunnel

Buildings

School

Church

Station

Mines and Quarries

Mine dump

Pits, gravel or other

Power lines

Pipe lines

Cemeteries

Dams

Levees

Tanks

Forest fire or lookout station

BOUNDARIES

- National or state
- County
- Township, U. S.
- Section line, corner
- Reservation
- Land grant

DRAINAGE

Streams
- Perennial
- Intermittent, unclass.

Canals and ditches (CANAL, DITCH)

Lakes and ponds
- Perennial
- Intermittent

Wells (flowing)

Springs

Marsh

Wet spot

RELIEF

Escarpments
- Bedrock
- Other

Prominent peaks

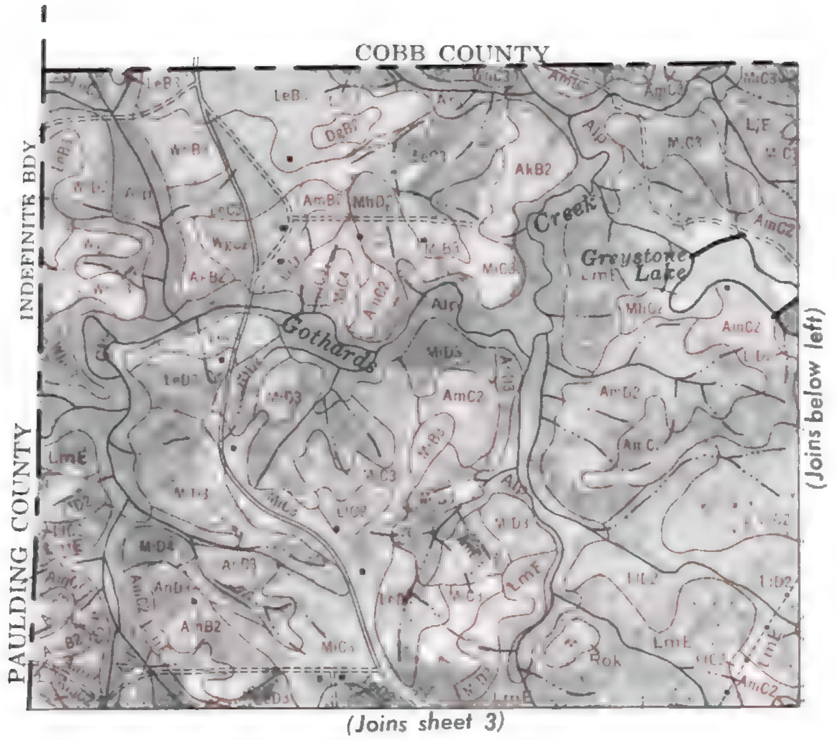
Depressions (Large, Small)
- Crossable with tillage implements
- Not crossable with tillage implements
- Contains water most of the time

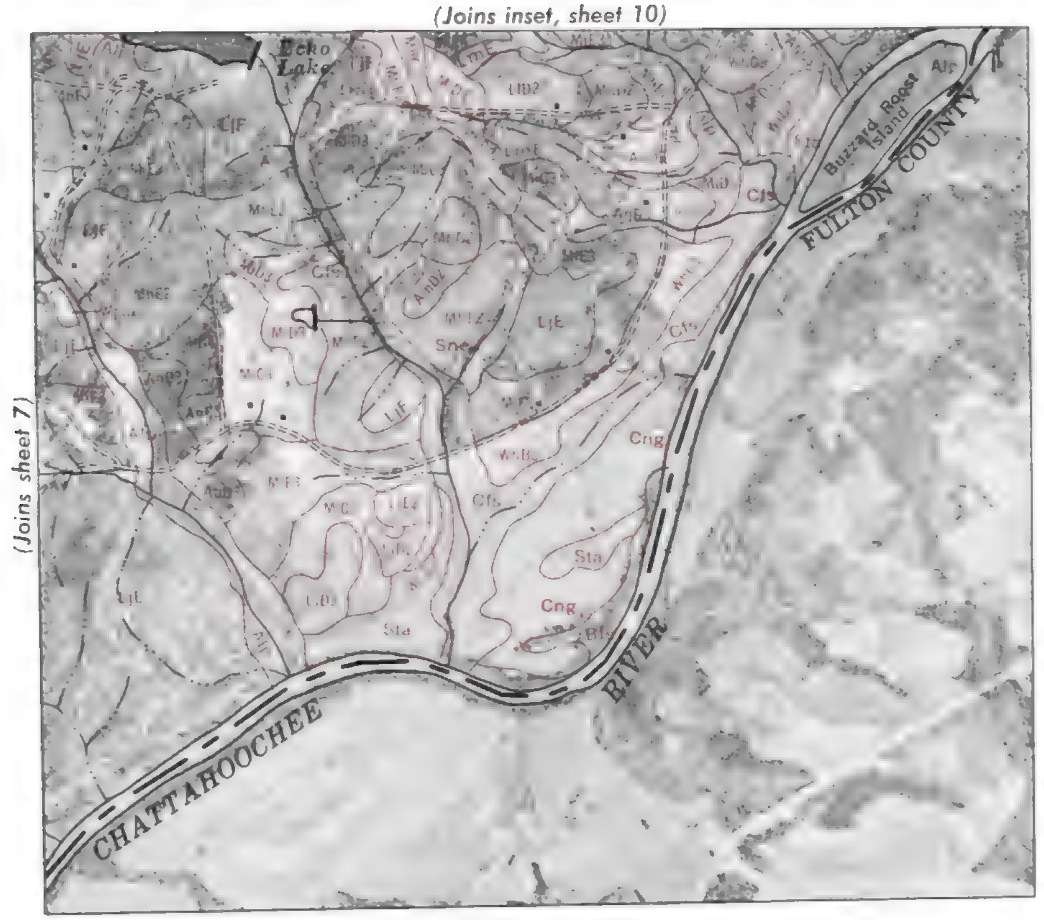
SOIL SURVEY DATA

- Soil boundary and symbol (Dx)
- Gravel
- Stones
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gullies

1

N





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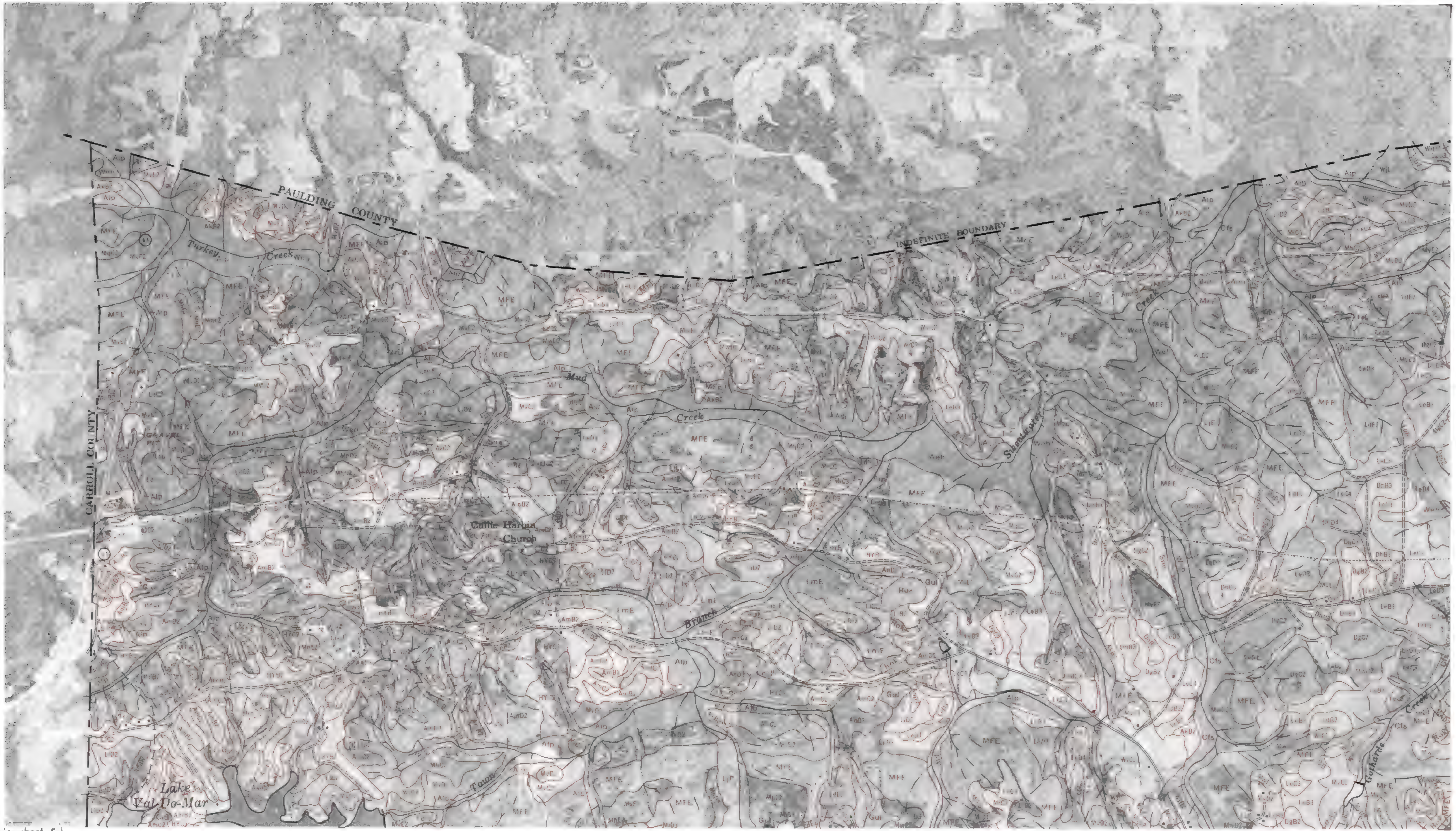
This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1955.

2

N



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3

N

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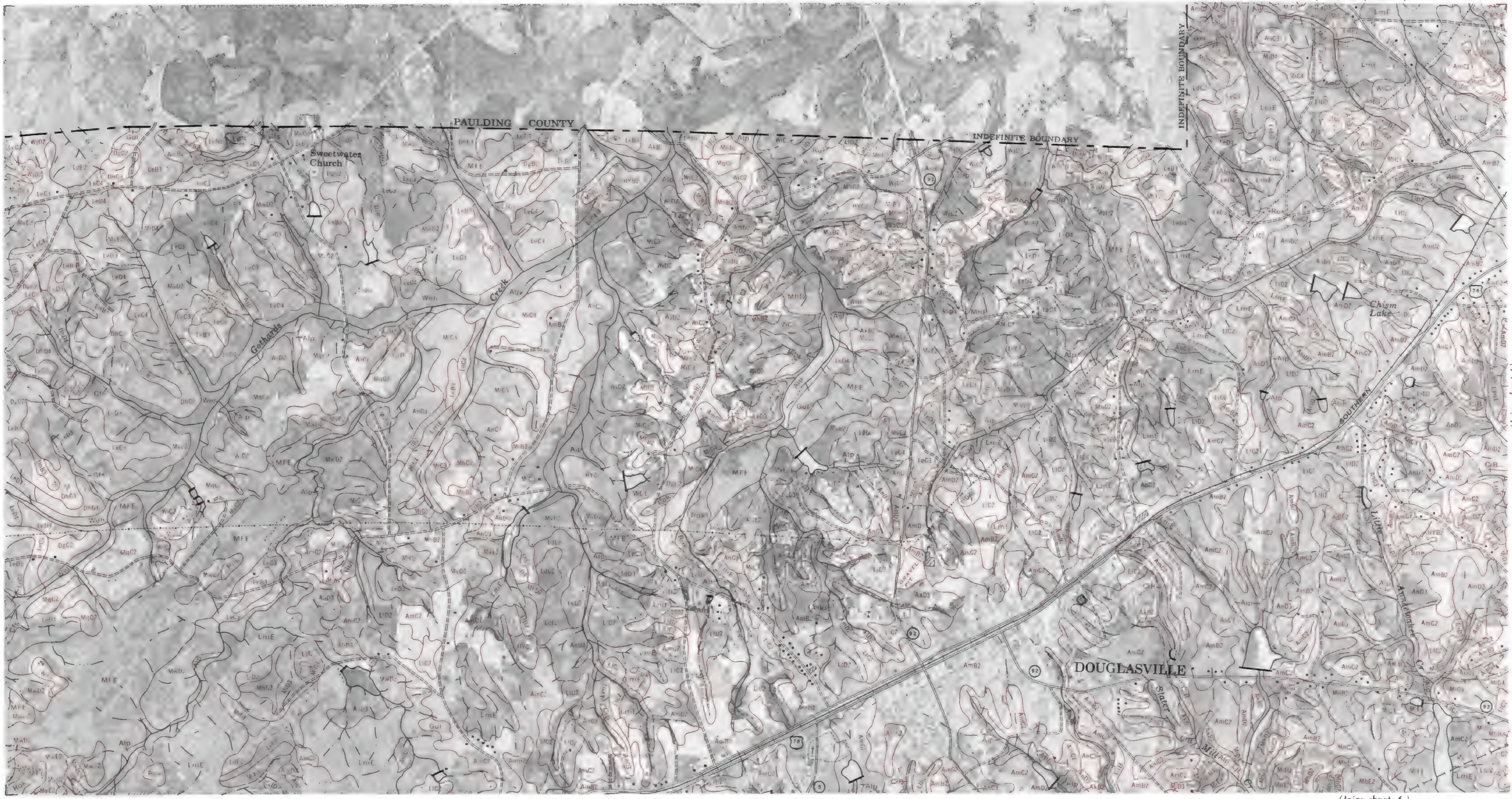

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DOUGLAS COUNTY, GEORGIA—SHEET NUMBER 4

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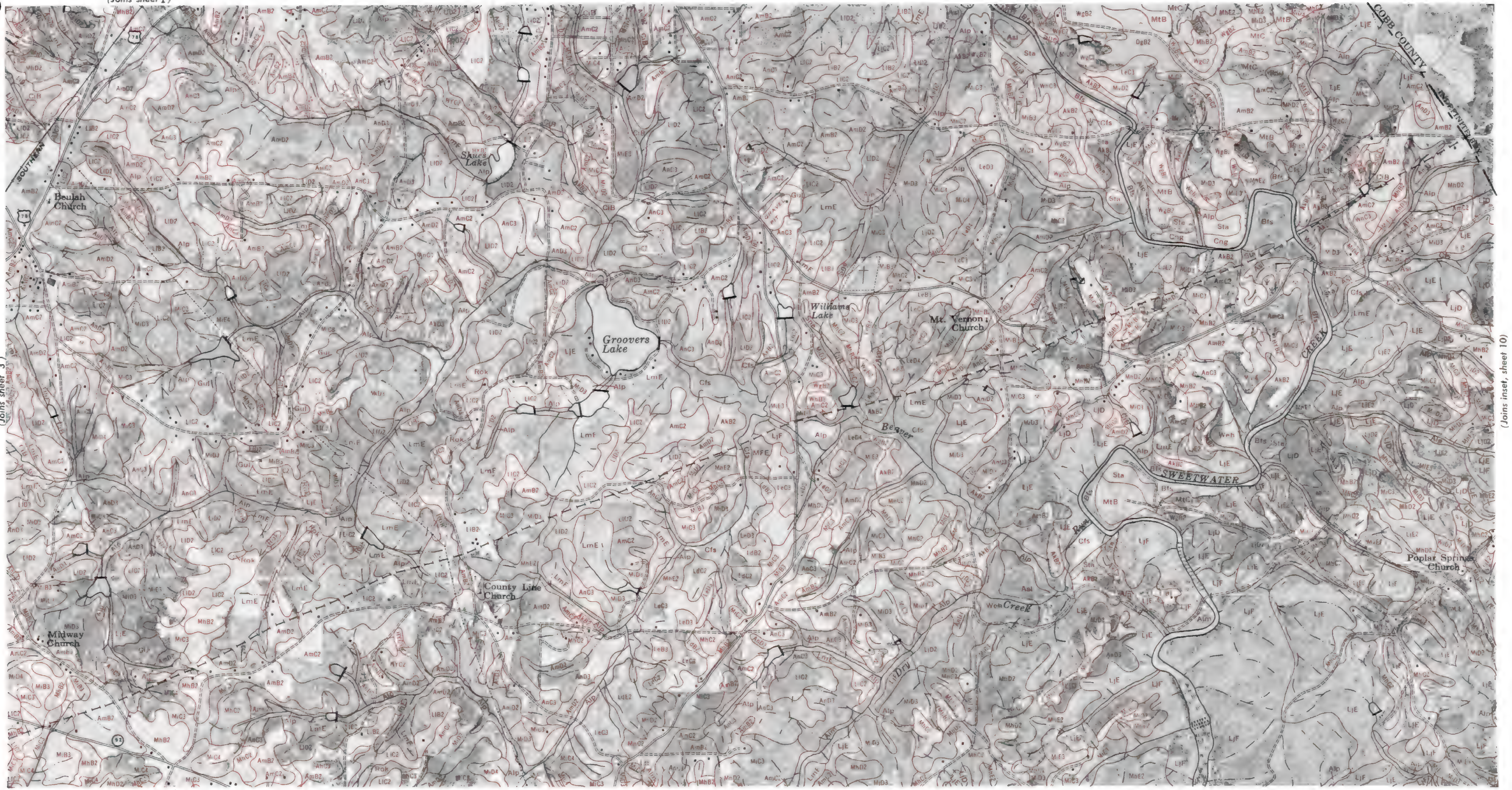
(Joins sheet 3)



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(Joins sheet 7)

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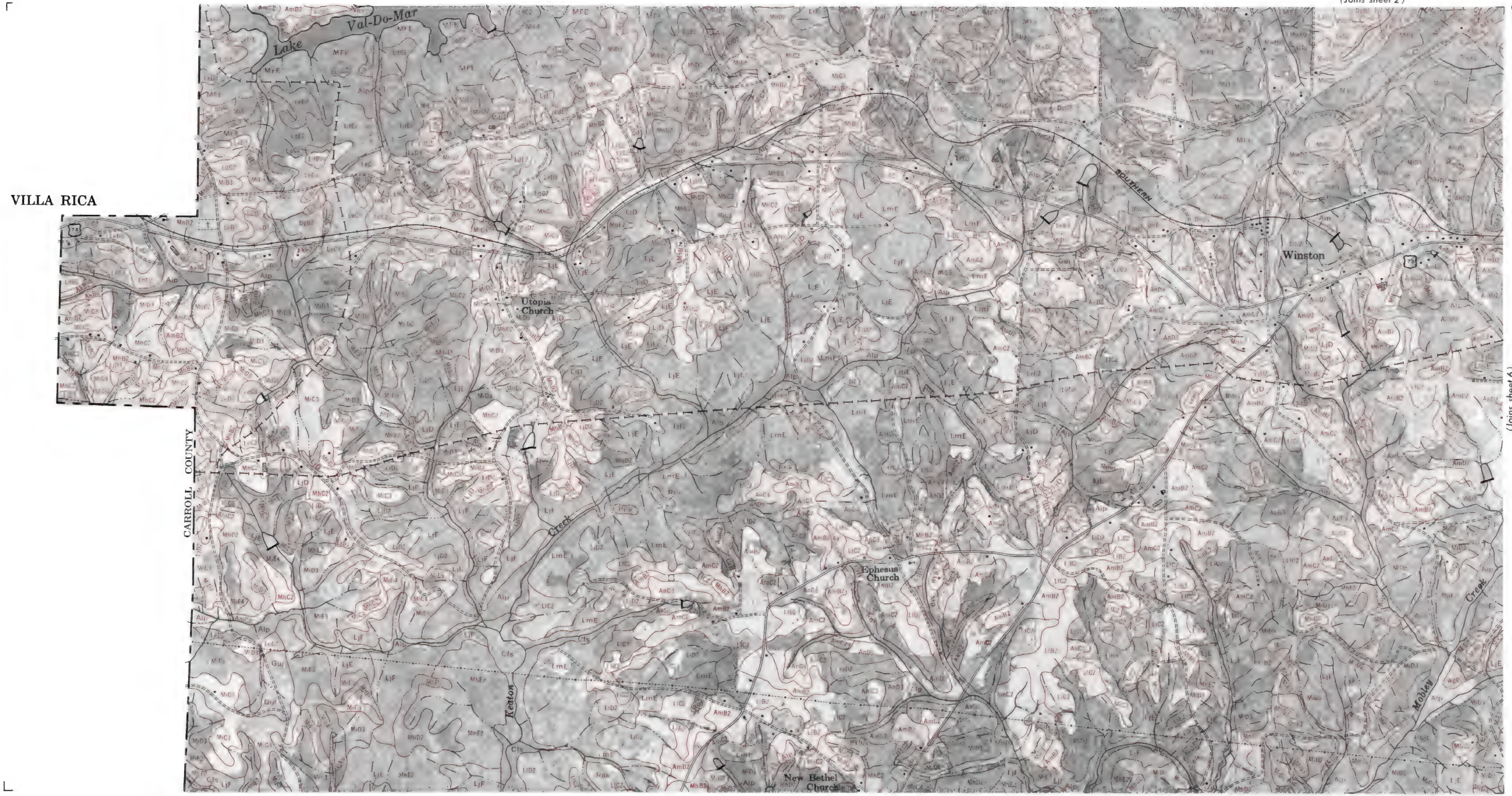
(Joins sheet 2)

5



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DOUGLAS COUNTY, GEORGIA—SHEET NUMBER 6

(Joins sheet 3)

(Joins sheet 5)

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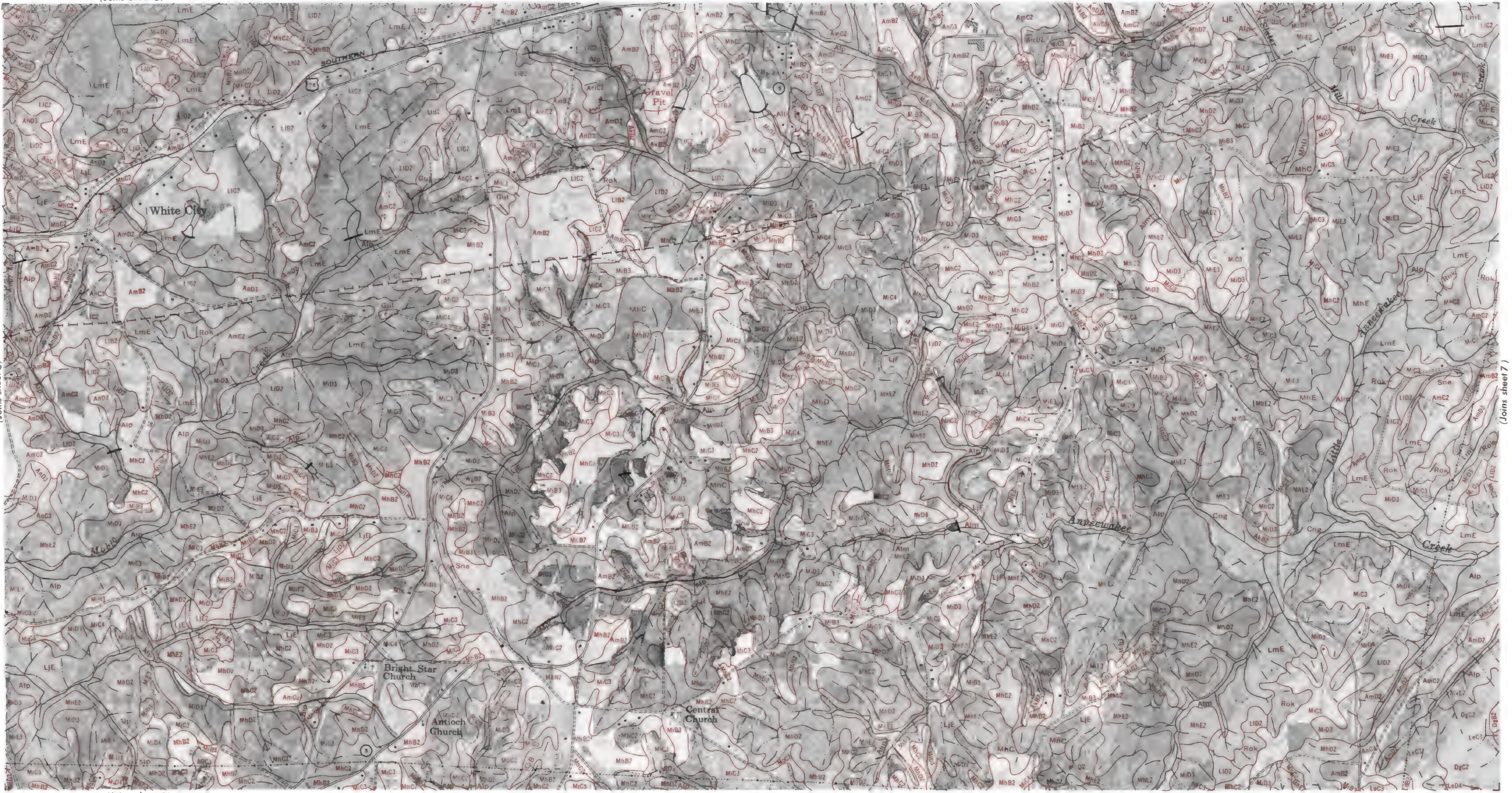

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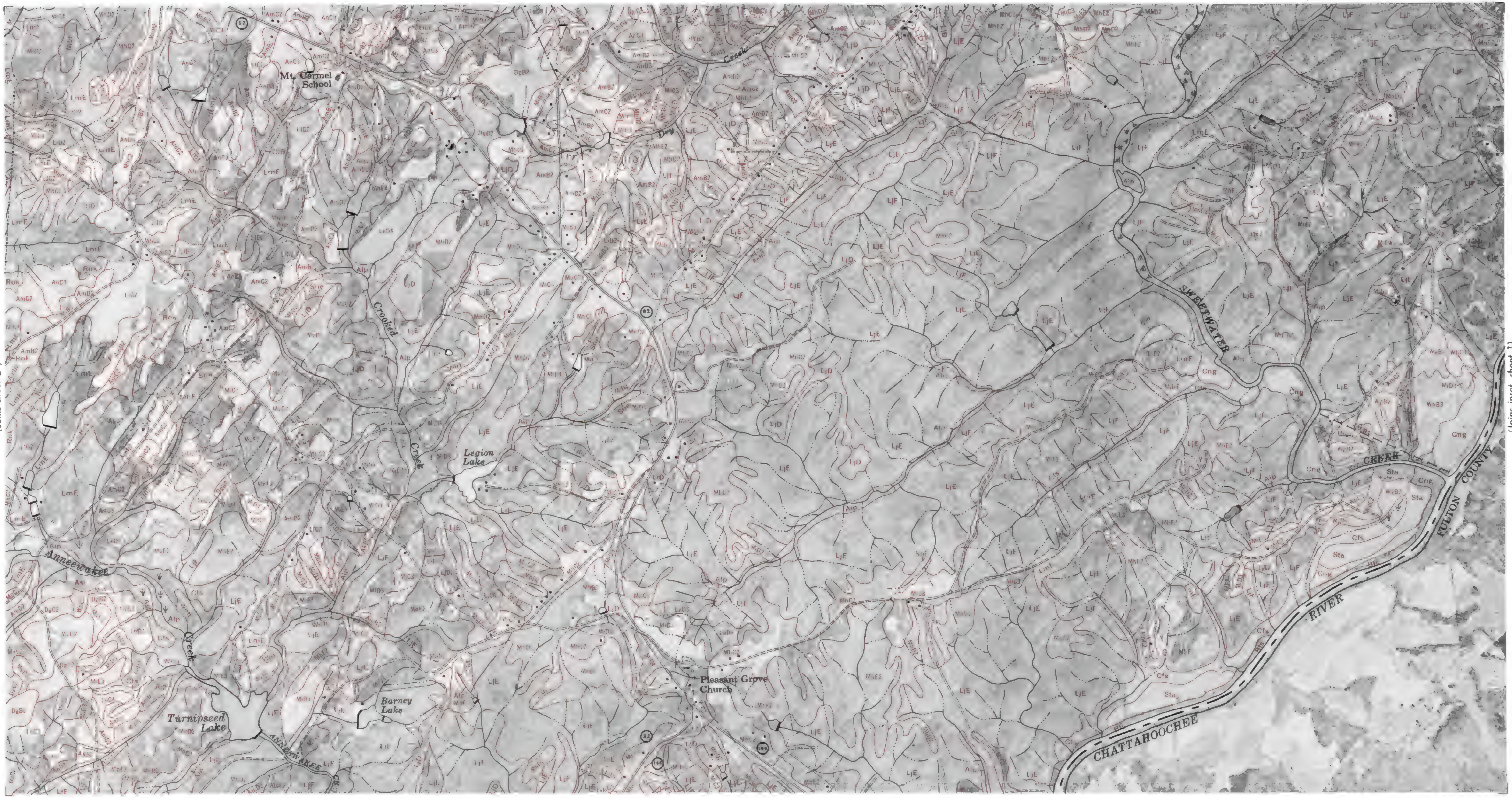
DOUGLAS COUNTY, GEORGIA—SHEET NUMBER 7

7

(Joins sheet 4)

(Joins sheet 6)



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Scale 1:20 000

0 ½ 1 Mile

0 5000 Feet

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8

N

(Joins sheet 5)

(Joins sheet 9)

(Joins sheet 11)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

9

(Joins sheet 6)

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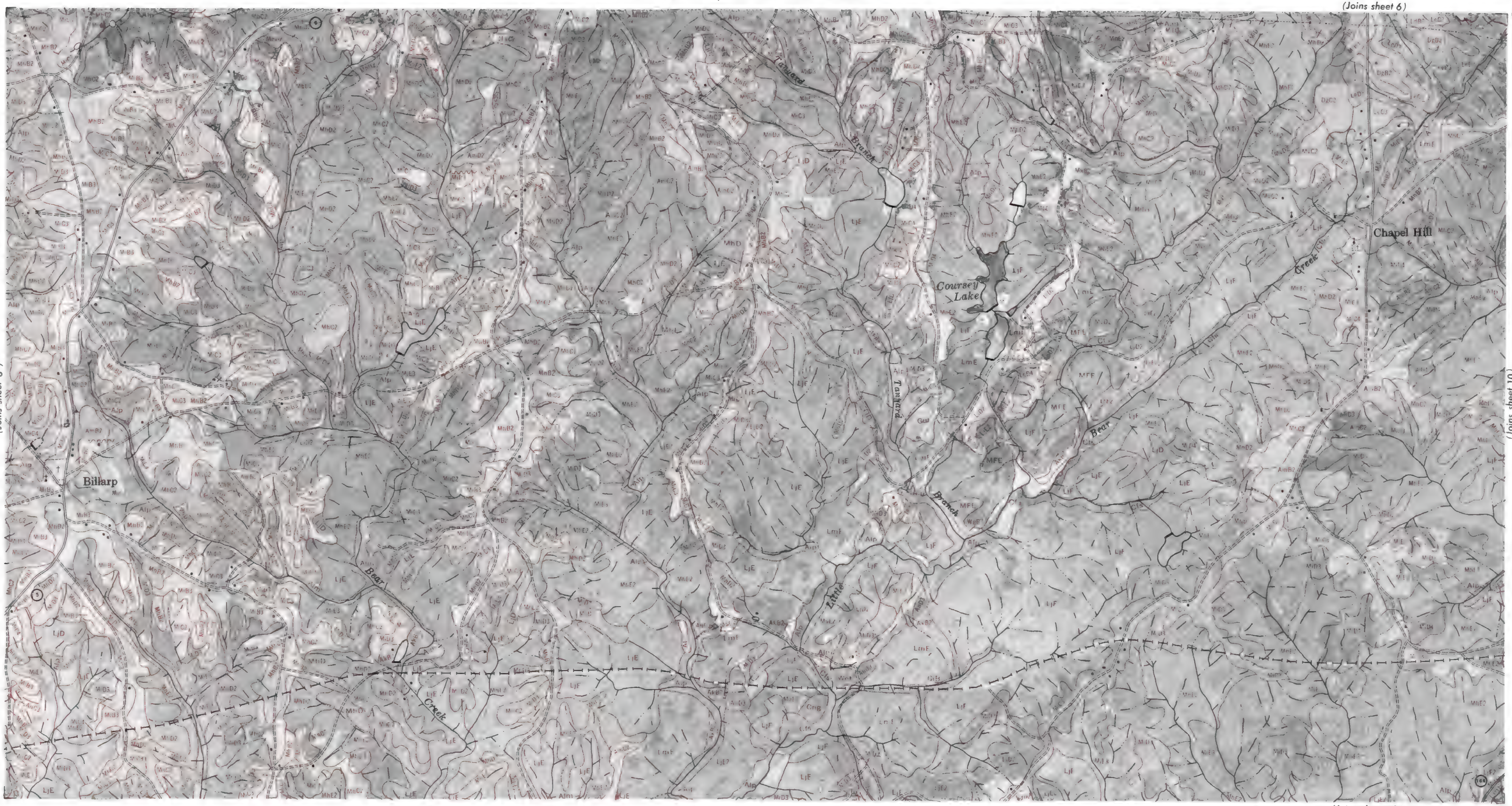

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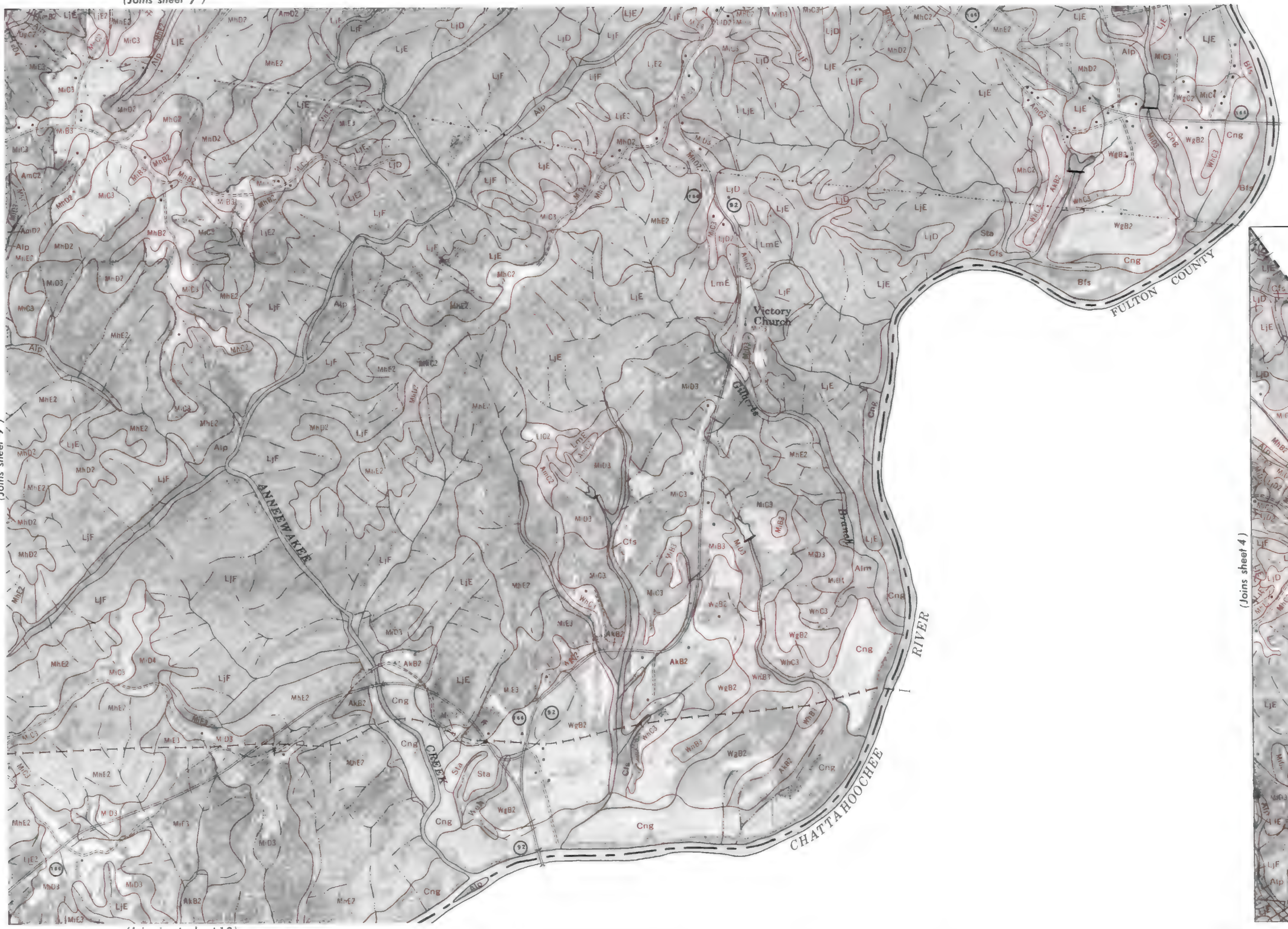
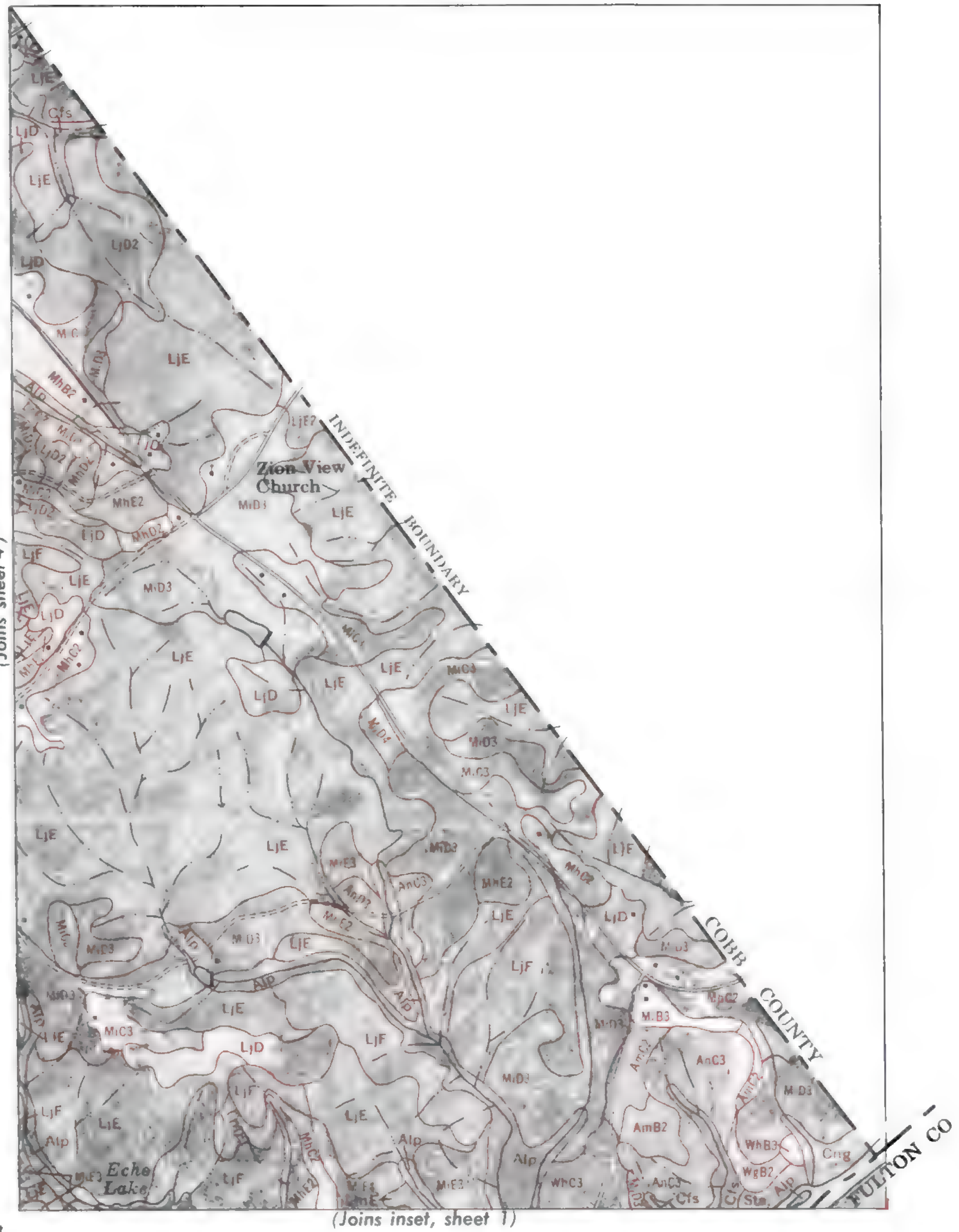
(10)





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DOUGLAS COUNTY, GEORGIA—SHEET NUMBER 11

11

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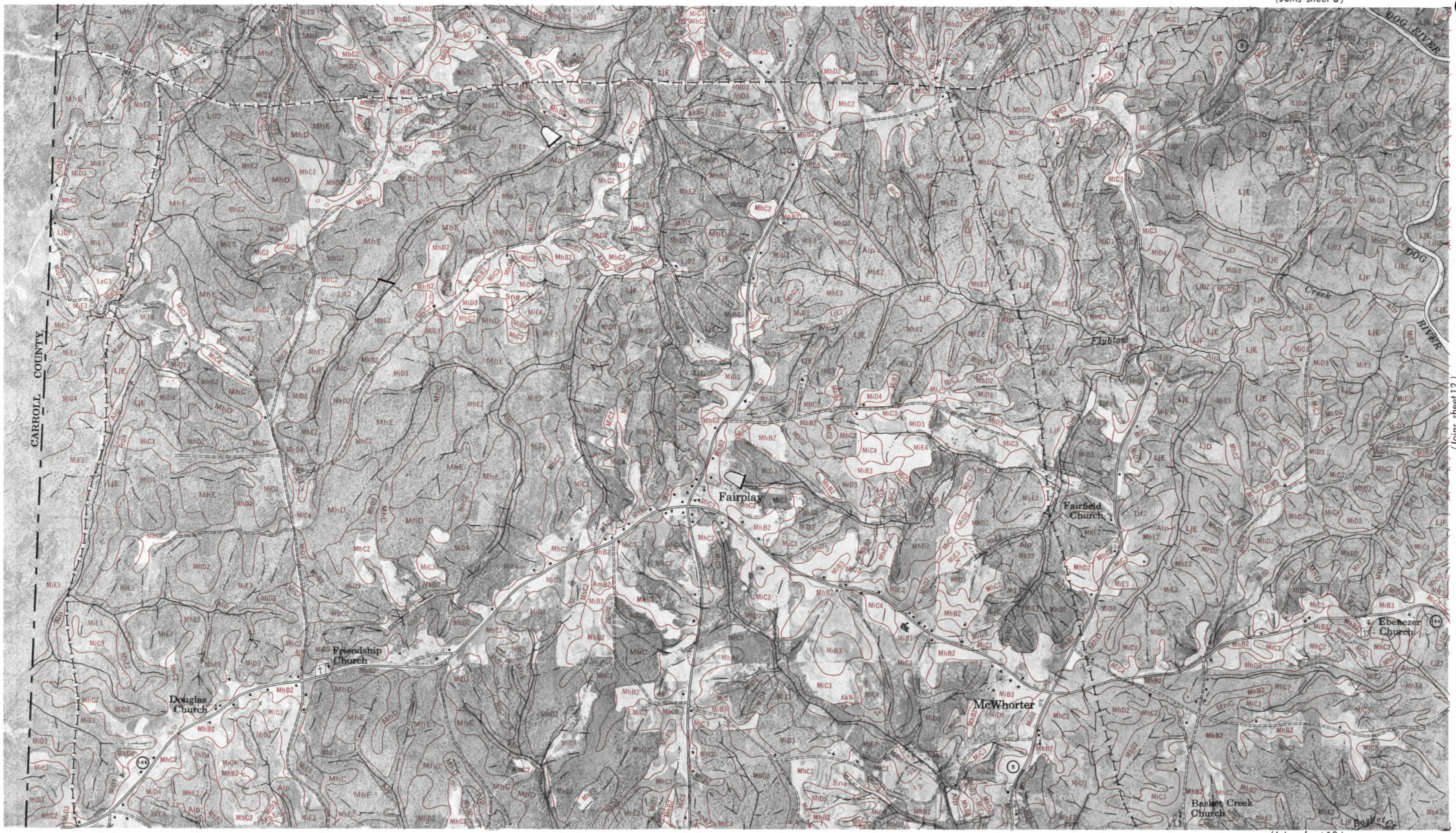

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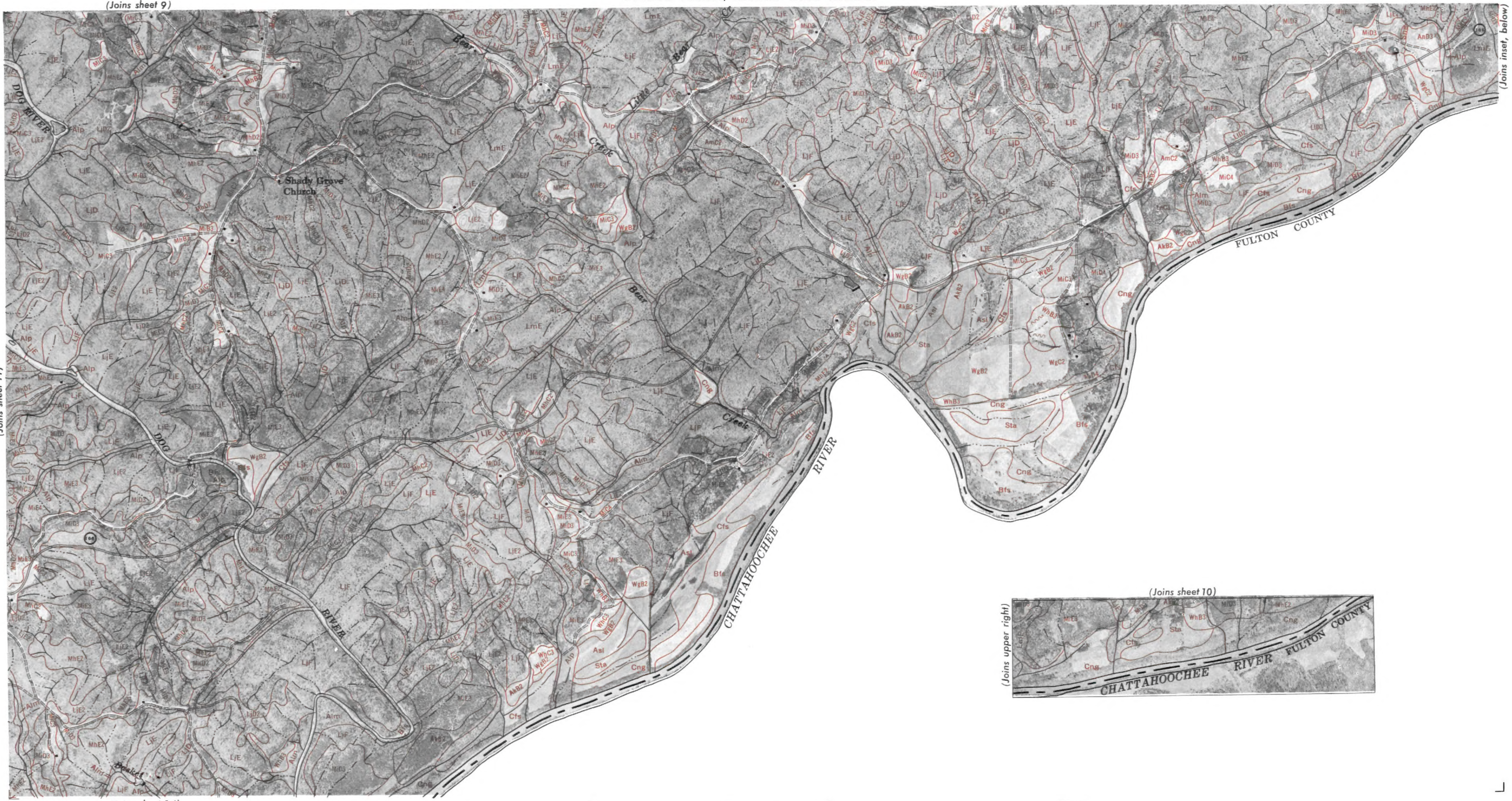
12



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DOUGLAS COUNTY, GEORGIA—SHEET NUMBER 13

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13

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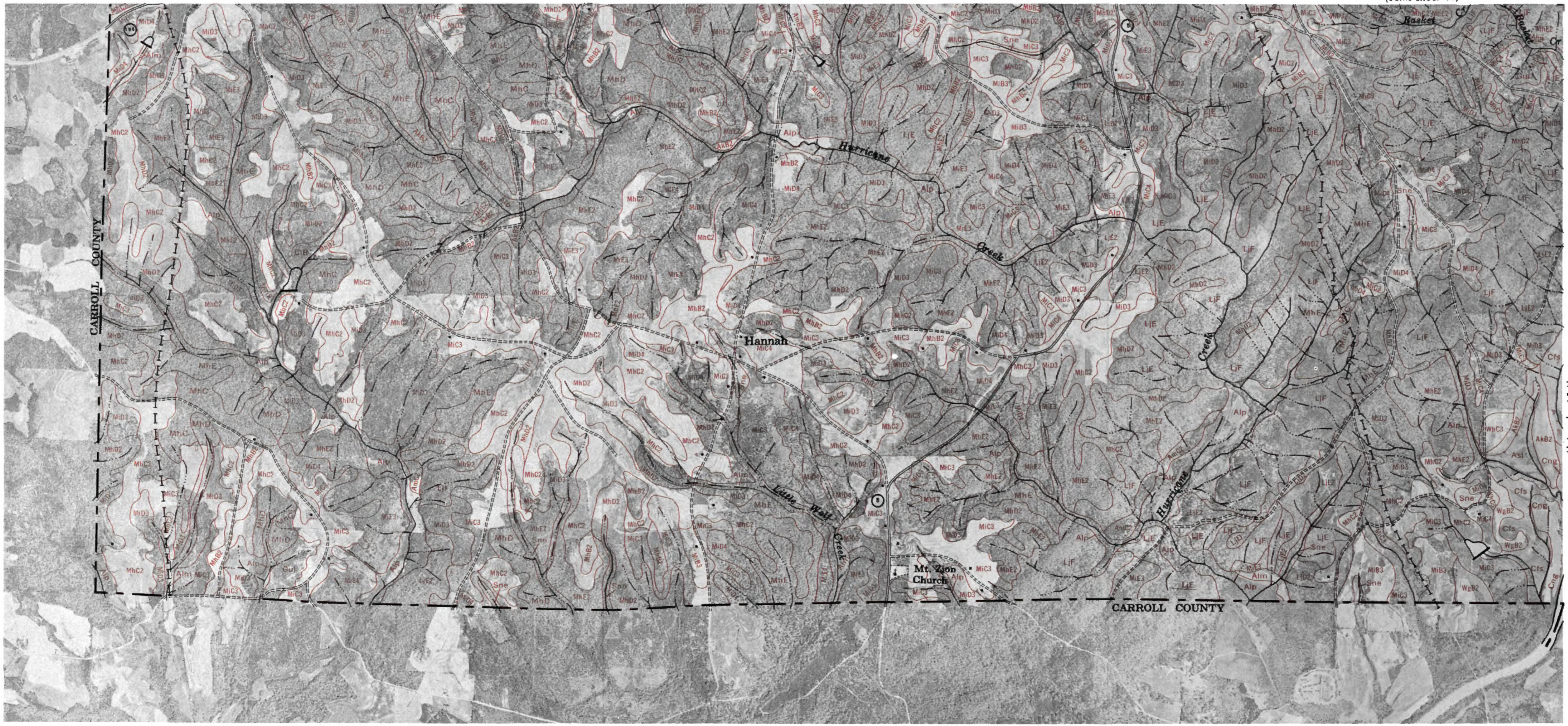

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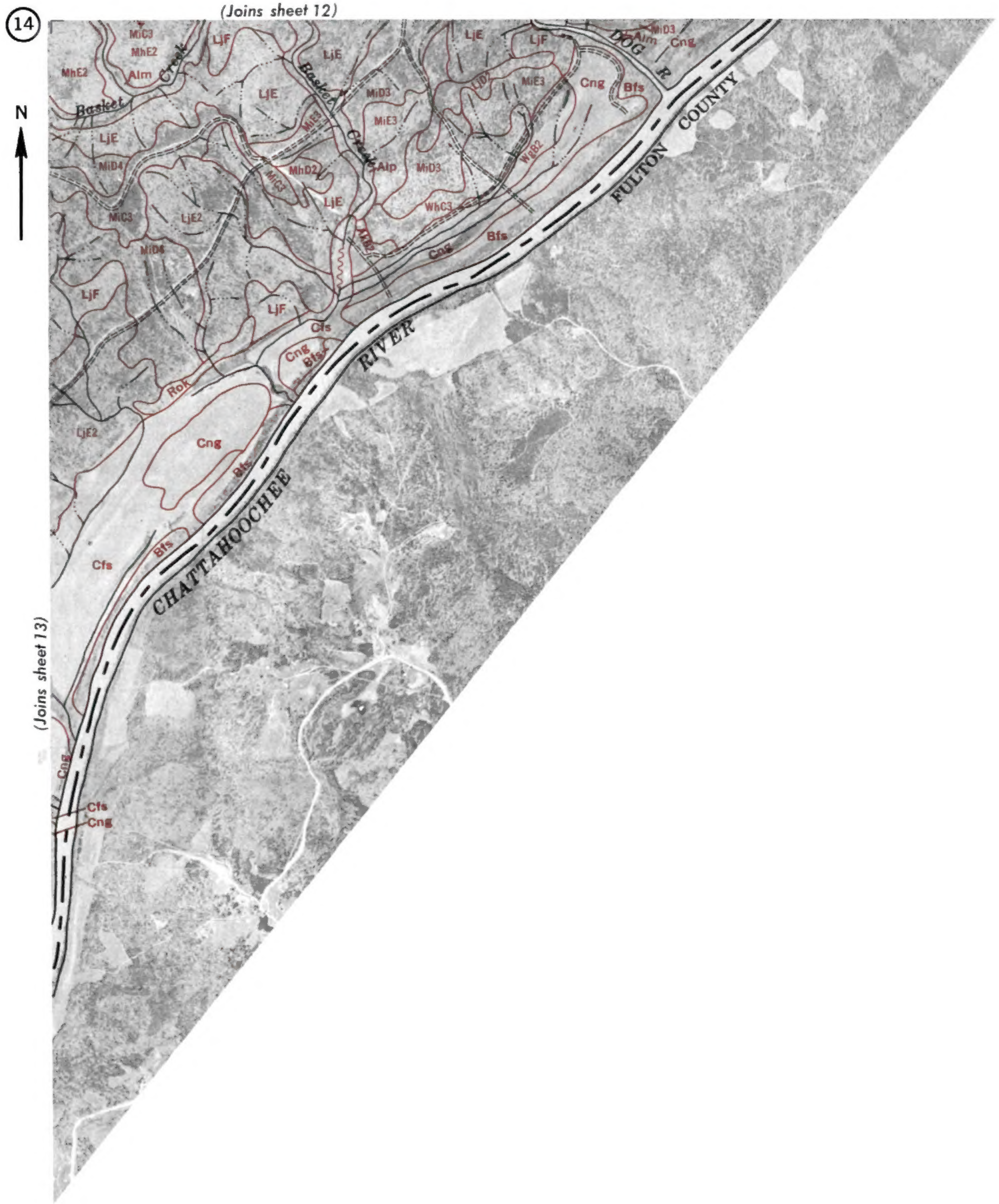

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